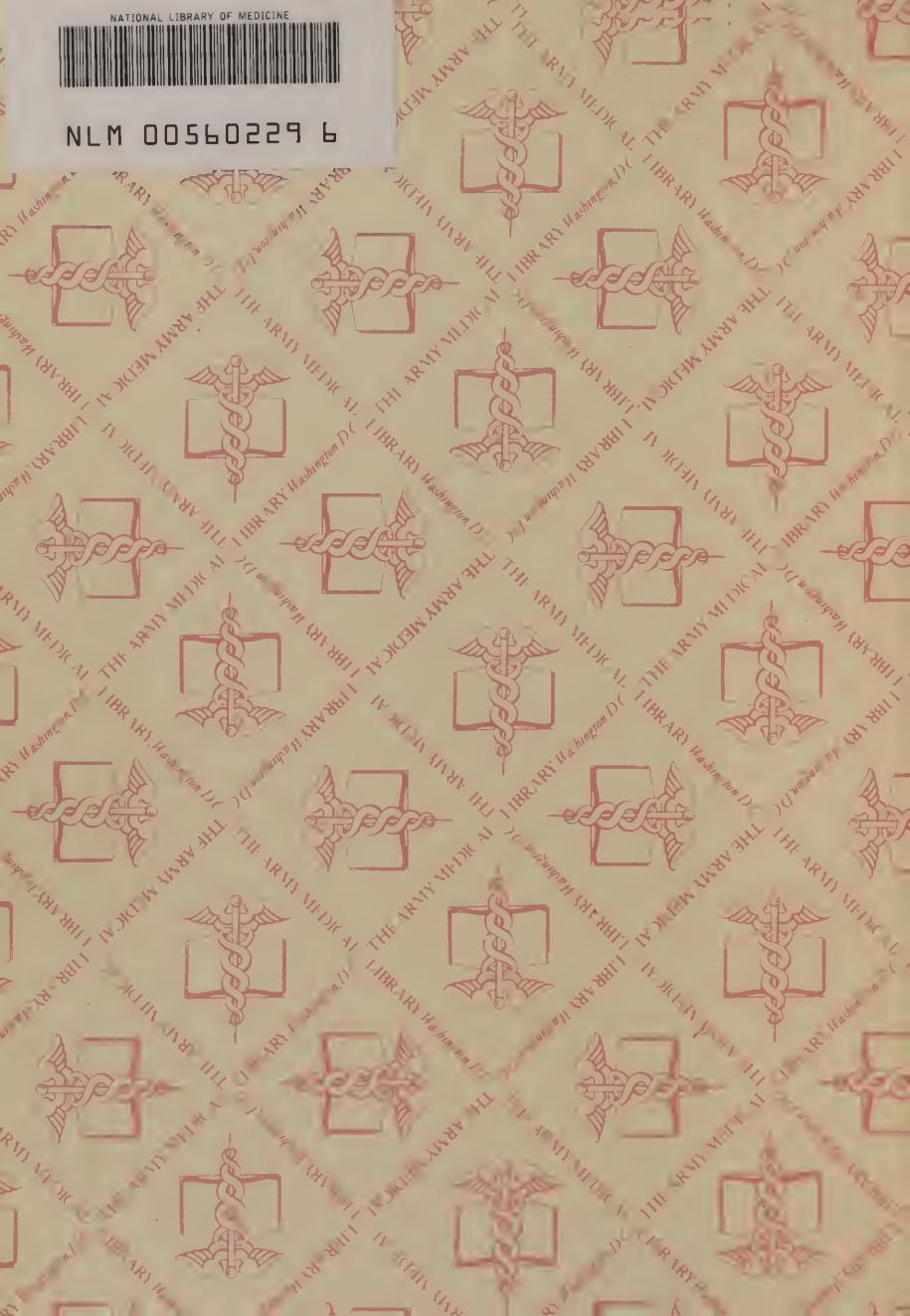
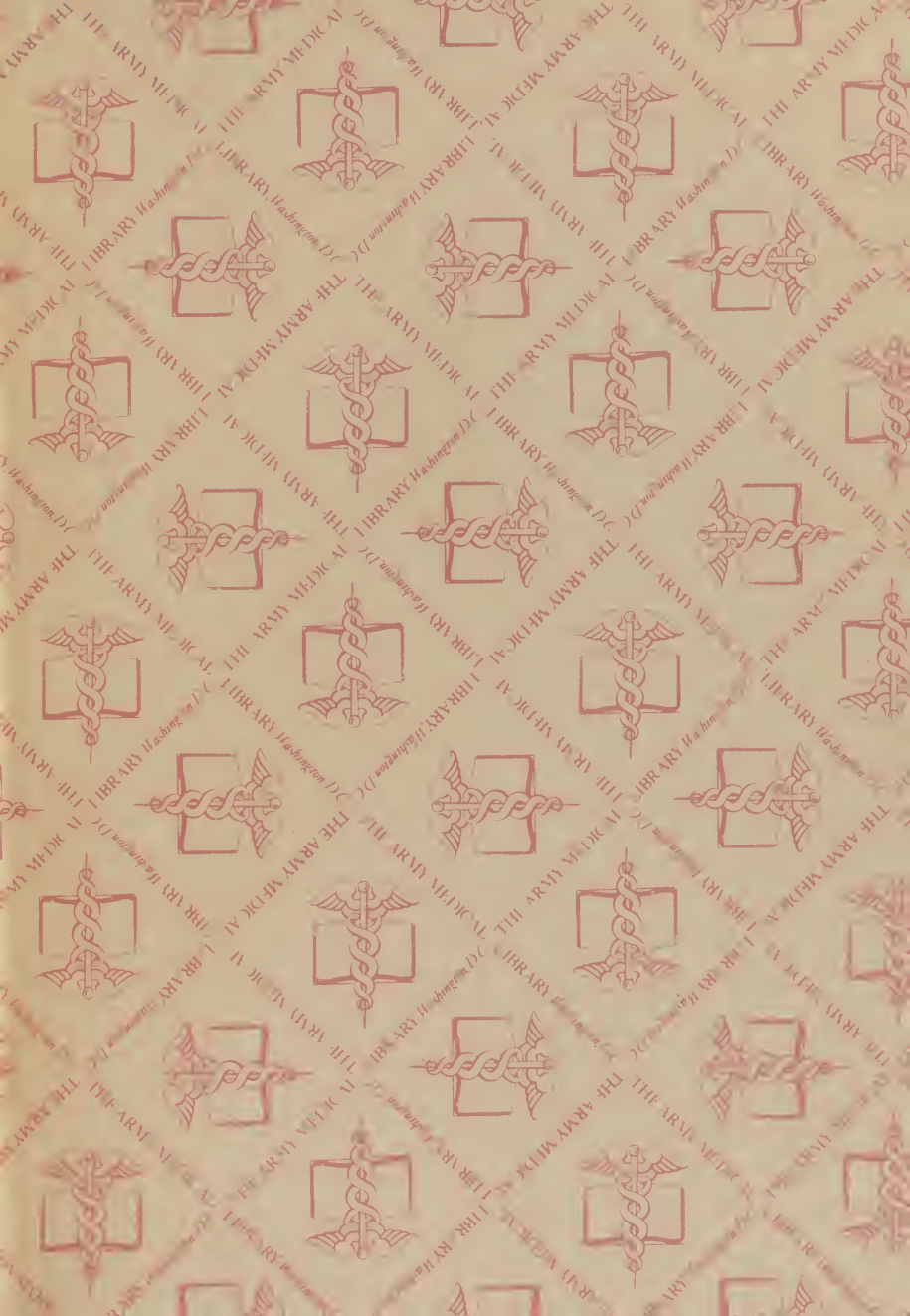


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HOLY CROSS HOSPITAL.

A SYNOPSIS
OF
CLINICAL SURGERY



DURING THE SERVICE OF

SAMUEL H. PINKERTON, M. D.,

SURGEON TO THE HOLY CROSS HOSPITAL,

BY

FRANKLIN A. MEACHAM, A. B., M. D.,

ASSISTANT SURGEON TO THE HOLY
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SALT LAKE CITY, UTAH,

FOR THE YEAR 1892.



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The large number of surgical cases possessing points of unusual interest gave rise to the idea of publishing these cases, with a short history of each case, containing all the salient features.

An effort has been made to avoid verbosity on the one hand without sinking to the level of statistics on the other. The main classification of the cases has been upon an anatomical basis as regards the field of operation, divided as follows:

Of these operations, 41 were performed upon the abdomen; 91 upon the head, face and neck; 15 upon the thorax; 46 upon the rectum and anus; 62 upon the genito-urinary organs; 62 upon the upper extremities; 109 upon the lower extremities, and 206 miscellaneous; making a total of 632. Each division is further divided according to the pathological conditions present. The total number of deaths was 17,

or a mortality of 2.6 per cent. Of the 17 fatal cases, 11 were *in extremis* at the time of the operation.

There were 90 fractures and 15 dislocations.

A few cases dating further back have been included, and several quite recent cases of special interest have been added. The details of modern antiseptic practice have invariably been rigidly adhered to.

The operator and assistant's hands were made surgically clean, and it is the custom in the more important operations, after the use of alcohol, to immerse the hands successively in a saturated solution of permanganate of potassium, saturated solution of oxalic acid, and a mild solution of hypo-sulphate of soda, followed by sterilized water. Their persons duly protected by freshly sterilized aprons.

The preparation of the field of operation was carefully carried out, as described later in operations on the abdomen. Vessels were tied with catgut sterilized just previous to the operation by boiling in alcohol for half an hour. Clean incised wounds in healthy tissues were closed. Where drainage was necessary strands of sterilized catgut, or fenestrated tubing, was used. Dressings of iodoform and bichloride (1:2000) gauze were used, making a satisfactory dressing.

The sponges were made of medicated gauze and pledgets of cotton, previously made into convenient sizes and placed in a porcelain dish and covered with a sterilized towel.

The after treatment consisted in surrounding the body by hot water bottles, if there was any evidence of shock, and morphine was administered if necessary.

If surgical shock and anæsthetic collapse were very pronounced, strychnine was given in full doses hypodermically, not less than one-twentieth of a grain every half hour to an adult, with a very surprising and satisfactory result.

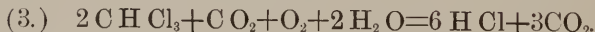
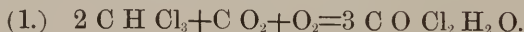
Drainage tubes were removed from twenty-four to forty-eight hours.

In addition there has been added a report of 104 amputations performed for injury and disease extending over a period of three years. Of these 104 amputations, there were ten deaths, or a mortality of 9.6 per cent.

It is worthy of note that in some thousands of etherizations not once were symptoms noted which occasioned serious alarm; while in not over three dozen chloroformizations, one child and two adults narrowly escaped death from the anæsthetic. The preference was given to chloroform in children, and in the abdominal cases in which the patients were already weak and suffering more or less shock at the time of the operation. When chloroform was used in emergency cases at night, especially when it was used for any length of time, as as for half an hour or more, a peculiar train of symptoms were observed to affect those present in the operating room as well as the patient himself. These symptoms consisted at first of a dry, irritating cough, gradually becoming more severe, a peculiar odor, a smarting sensation to the eyes and nose, and a great sense of oppression in the chest. This latter symptom on one occasion was of such a severe character that one of the assistants was forced to leave the room and the windows and transoms had to be opened.

On these occasions chloroform was used in preference to ether because of the fact that the operating room was lighted by four gas jets just above the operating table. The patients' condition at these times caused not a little anxiety, and in one case it was with difficulty that death was averted, although all were not like affected. These observations caused considerable comment, and no satisfactory explanation could be given, yet all agreed that it was in some way due to the chloroform vapor. Squibb's chloroform was used each time. The room was large, well ventilated and heated by steam.

These facts remained unexplained to the writer until an article appeared in the *Therapeutic Gazette* for January, 1893, page 48, where a doubtlessly correct explanation of the difficulty is given. In this article Charles Martin shows that chloroform in the presence of a naked flame has special dangers, and the after effects bronchitis no rarity. He also shows that the final result is that for every two molecules of chloroform that are decomposed in the presence of the naked flame, six molecules of hydrochloric acid may be formed. The formulæ for the chemical change he gives as follows:



In the presence of this hydrochloric acid gas becoming more and more concentrated on the mucous membranes by being absorbed by the moisture covering them, that produces the irritating cough, the acrid odor, and the other unpleasant symptoms described.

Dr. Paterson, of Cardiff, refers to the same difficulties in the *Practitioner* for June, 1889, and Prof. Zweifel, abroad, shows that it is no peculiarity of a gas flame, but that the only essentials are the presence of chloroform vapor in the atmosphere which feeds a naked flame.

OPERATIONS UPON THE ABDOMEN.

There were 41 operations upon the abdomen, with ten deaths, or a mortality of 24.3 per cent. Of this number, four were for cystic disease of the ovary, or broad ligament, with one death from intestinal paralysis. Three were hysterectomies, with two deaths; one from general septic peritonitis, caused by a suppurating fibroma, and the other from intestinal paralysis. Four were operations on the liver, with one death from shock. Four were on the kidney, with no deaths. One for ligature of the common iliac artery, with one death from shock. Eleven for appendicitis, with three deaths from general septic peritonitis. Nine for herniæ of different varieties, with one death, the operation being done for prolonged strangulation. Five were unclassified, with one death from intestinal paralysis.

Although the mortality of 24.3 per cent. is high, yet six of the patients were *in extremis* at the time of the operation.

Among the important abdominal cases may be mentioned the operation for ligature of the common iliac artery, for aneurism of the external iliac artery by the intra-peritoneal method, as suggested by Frederick Treves. Mr. Treves, in his "Manual of Operative Surgery," states that "the recent tendencies of abdominal surgery render it probable that in

the near future the artery will be reached by a simple incision into the peritoneal cavity through the anterior abdominal parietes;" but also states "that he is not aware that the operation has been carried out on the living subject." Dr. Dennis of New York reports three cases of ligaturing the internal iliac arteries by the intra-peritoneal method as far back as 1886.

In the *British Medical Journal* for October 29th, 1892, Dr. Marmaduke Shield started a very interesting question as to the propriety of ligaturing the iliac arteries through the peritoneum.

Mr. Shield's letter elicited a communication from Mr. Clement Lucas, in which he states that in June, 1889, acting on the great safety with which coeliotomy can now be performed, ligatured the common iliac artery through a median abdominal incision for a rapidly increasing aneurism of the external iliac. The operation was performed with ease and the patient recovered rapidly without suffering from shock, fever or any untoward symptom. Unfortunately the details of this case have never been published.

W. Mitchell Banks, M. D., in the *British Medical Journal* for November 26th, 1892, reports a case of successful ligaturing of the external iliac artery by the intra-peritoneal method for aneurism of the external iliac. The incision, three inches in length, was made in the right linea semilunaris.

A large cyst of the pancreas. Also an echinococcus cyst of the gall bladder, which were successfully opened and drained.

OPERATIVE METHOD.

In all operations upon the abdomen the general plan pursued may be summarized as follows:

Preparation of the Patient.—For two or three days preceding the operation the bowels are mildly purged and the diet carefully regulated. In some few cases, where the conditions were favorable for serious shock, free stimulation was resorted to. When possible, the night before the patient was given a warm and cleansing bath and the field of operation carefully cleansed with soap and water and the parts shaved. A large wet dressing of 1-2000 bichloride solution was applied and covered with oil silk. This was allowed to remain over night and not removed till just before the operation, when the field of operation was again washed with soap and water and equal parts of ether and alcohol.

Antisepsis.—The instruments were always boiled for half an hour or more just before the operation in a one per cent. solution of carbonate of soda, and during the operation were kept in trays containing either boiled water or a 1-60 solution of carbolic acid. The sponges were kept in boiled water, and no anti-sepsis was used during the operation. The abdominal cavity was only irrigated in special cases and then only with boiled water.

Drainage.—The glass drainage tube was used in about half the cases, and in only those where drainage was needed. In some cases where there was any tendency to oozing, a tampon of iodoform gauze was inserted.

Abdominal Suture.—The peritoneum was sutured with continuous catgut sutures, the muscles and integument with silver wire and the integument by a separate line of interrupted silk sutures.

Sutures.—For the past four or five months all catgut, silk and wire sutures were boiled in alcohol for one-half to one hour. For tying bleeding points in making the abdominal incision a small glass reel about one-half inch long by one inch in width, holding about three yards of fine catgut, previously boiled for one-half hour in alcohol, was used. This was handled by no one except the operator.

After Treatment.—As soon as the patient was taken from the operating table, if there was any evidence of shock, the body was surrounded by hot water bottles, and hot water and whisky injected by the rectum. During the first twenty-four hours nothing was given by the mouth except a little hot water. Morphine was used as little as possible. Drainage tubes were removed on the second day and liquid food given in small quantities. Sutures were removed on the tenth day or earlier if the case allowed. The symptom most dreaded was intestinal distention, and all clinical aids, assistants and nurses were on the watch for. At the first onset of tympanites a stimulating enemata of soap and turpentine was administered, more especially if there was no passage of flatus per anum. If the enemata did not answer, a mild saline purgative was given and repeated every hour till it acted. If vomiting occurred, calomel was given instead of the saline purgative.

NEOPLASMS.

CASE I. *Large Ovarian Cyst; Coeliotomy; Recovery.*—E. J. S., aged thirty-four, unmarried, was admitted to the hospital December 5th.

Examination showed a large tumor of the abdomen, of three years' standing, which had been steadily increasing in

size and accompanied by pain. The whole abdomen was greatly distended with a fluctuating and symmetrical spheroid tumor.

Operation.—Ether. A median abdominal incision four inches in width was made, through which a pearly white tumor could be seen and felt. The contents, clear as spring water, were evacuated. The pedicle ligatured and a large unilocular cyst of right ovary was removed. The abdominal wound was closed and no drainage used. Primary union and a rapid and uninterrupted recovery.

CASE II. *Cystic Adenoma of Ovary; Coeliotomy; Died.*—Mrs. E. T., aged thirty-four years, married, but had had no children. One miscarriage several years previous to her admission to the hospital. She had been a sufferer for a great many years with pain and tenderness in the region of the right ovary. About one year previous to her admission to the hospital she first noticed that she suffered intense pain low down in the abdomen at every act of defecation, more especially when she was constipated, at which time the pain was so great and of such a sickening character that she had often fainted.

Examination.—The uterus movable and the cervix high up. In Douglas' cul-de-sac, a tender mass about the size of an English walnut was felt, exquisitely sensitive to the touch, so much so that chloroform was administered and pushed to complete anæsthesia before the examination could be completed. Examination per rectum revealed the same tender mass as in the cul-de-sac.

Operation.—Ether. Median incision three and one-half inches. The right ovary and tube were found displaced in Douglas' cul-de-sac and bound down by firm adhesions. Both tube and ovary were removed. The ovary was considerably enlarged and contained a number of small cysts. No drainage or irrigation was used. On the second day intestinal distention set in. It was only learned at this point that the patient had been an opium habitu  . In spite of anything that could be done the distention increased and the patient sank and died on the fifth day. Cause of death, intestinal paralysis.

CASE III. *Cystic Adenoma of Ovary; Coeliotomy; Recovery.*—E. B., aged nineteen, unmarried. Her menstrual history has been irregular and for several years has suffered severe pain in the region of the right ovary at each menstrual period, attended with a very offensive discharge.

On examination the uterus was found movable and a discharge coming from the cervix. In the region of the right ovary can be distinctly felt a tumor about the size of an English walnut.

Operation.—A median incision about three and one-half inches in length. The right ovary and tube were bound by firm adhesions, both of which were easily removed. The ovary was considerably enlarged and contained several small cysts, each containing a straw-colored fluid. No drainage or irrigation was used. Her recovery was uneventful except for several stitch abscesses which formed, retarding convalescence.

UTERINE FIBROIDS.

There were six cases of uterine fibroids. Three of these were materially benefited by intra-uterine applications of galvanism, and the salient points are tabulated below. The remaining three cases were not benefited by the electrical treatment.

In Case I., we had, as shown by abdominal section, a broken down and suppurating sub-peritoneal fibroid. In this case the patient was intolerant of mild galvanism and the post-operative effects were severe. Diseased adnexæ or pelvic suppuration were entertained, but she refused an operation and left the hospital only to return six weeks later in almost a state of collapse, when an operation was performed as a last resort and with only a little hope of success. In Case II., the hemorrhage was profuse and not benefited by the electrical treatment. Removal of the uterus by an abdominal incision showed the organ a mass of small fibroids projecting into the

uterine canal. In consequence, the canal was very tortuous and its entire length could not be cauterized by the electro-galvanic cautery. In Case III., it was impossible to introduce an electrode into the uterine canal on account of the cervix being pushed well up against the symphysis pubis. Electro-negative puncture was not tried.

CASE I. *General Septic Peritonitis, dependent on a Suppurating Fibroid of Uterus; Abdominal Section; Death.* Mrs. M. L., aged thirty-two, primipara. Came to the hospital on account of frequent pelvic pain, complaining of great pressure on the rectum and bladder, and a tumor in the lower part of the abdomen.

On examination the patient presented the appearance of good health. There was a hard oblong tumor about eight inches in its long and four inches in its short diameter, attached to the fundus and left side of the uterus. The uterus was only slightly enlarged, and its canal, which was posteriorly directed and to the right, was about three inches in depth. Menstruation had been profuse, lasting six or seven days and accompanied with pain. She had had paroxysmal attacks of severe pelvic pain. Locomotion difficult. A diagnosis of sub-peritoneal fibroid growth and consecutive pelvi-peritonitis was made, with a probability of diseased adnexæ. Intra-uterine applications of galvanism were tried, but she was intolerant of this and its use had to be discontinued. Faradism was used and there was some marked amelioration of the pain only. Abdominal section for removal of the growth and diseased adnexæ was suggested, but the patient at once refused to submit to any operation and left the hospital. About six weeks later she was attacked with severe paroxysmal pain and was confined to her bed, where she had been for some days. She was taken to the hospital in a condition bordering on collapse. The day previous she had a severe chill, followed by a high fever. On admission November 29th, her temperature was 103° F.; pulse, 140; respiration, 40. Considerable tympanites. Nausea and vomiting. General abdominal tenderness. Abdominal section was made a few hours later as a

last resort and with only a very slight hope of success. The intestines were found greatly distended, markedly congested and adherent to each other by old adhesions which bled profusely on attempting to separate them. A turbid serum was found in the abdominal cavity. Firmly attached to the adjoining parts by old adhesions was a broken-down and suppurating sub-peritoneal fibroid of the uterus. This was removed and the abdomen irrigated and drained. The condition of the patient did not permit an examination of the adnexæ. She never recovered from the shock and died fourteen hours later. No autopsy.

CASE II. *Hysterectomy; Recovery.*—Mrs. M. C., aged thirty-two. No children. Was sent to the hospital for the galvanic treatment of a bleeding fibroid. Hemorrhage was excessive. The uterus was found to be about the size of a three months' pregnancy and its canal was four inches in depth. Positive applications of galvanism of full doses were used once in forty-eight hours. Her general health improved but the hemorrhage did not cease at all. Abdominal section was performed August 26th. The uterus was found to be one mass of small fibroids on the interior and exterior of the uterine walls, varying in size from a hickory nut to that of the fist, and some of these projecting into the uterine canal. The uterus was removed and the pedicle treated by the extra-peritoneal method. The patient made a rapid and uninterrupted recovery.

F. H. Martin's "Electricity in Diseases of Women," page 179, gives a similar case where electricity failed to relieve because the fibroid masses, projecting into the uterine canal, so distorted it that a proper electro-galvanic cauterization of its interior was impossible.

CASE III.—*Hysterectomy; Death.*—J. L., aged twenty-eight, unmarried. Came to the hospital on account of a large tumor of the abdomen of several years' standing, and rapidly increasing, together with a great discomfiture in the bowels and bladder. The growth was a large interstitial fibroid tumor of the uterus and producing a deformity simu-

lating a six months' pregnancy. The cervix was pushed well up behind the symphysis pubis, on which account it was impossible to enter the uterine canal with any form of electrode. For which reason intra-uterine galvanism was not used. The growth was removed through an abdominal incision and the pedicle treated by the extra-peritoneal method. The patient never recovered from the operation and died five days after from intestinal paralysis.

CASES.	SIZE OF TUMOR.	SYMPTOMS.	DURATION OF TREATMENT AND METHOD.	ULTIMATE RESULTS.
Case IV. Mrs. McV.	Uterus, 6½ inches in depth. Fills the entire pelvis and lower abdomen.	Large hemorrhagic, interstitial and subperitoneal. Nodular. Pain. Great pressure on bowels and bladder.	60 applications of galvanism every fourth day; 40—, and 20+ of 150 milleampères each.	General health improved. Tumor easily reduced; pressure on bowels and bladder removed. Still under treatment.
Case V. Mrs. M. T.	Tumor about the size of child's head. Depth of uterus, 5 inches.	Myo-fibroma of right side of uterus. Excessive hemorrhage accompanied and followed by excruciating pain.	Galvanism for four months. Positive applications of 160 milleampères.	General health improved. Hemorrhage and pain ceased. Tumor reduced three-fourths.
Case VI. Mrs. E. C. J.	Uterus, 4½ in. in depth; growth about 10 in. in its long and 6 in. in its short diameter. Irregular in outline. Attached to fundus & post. wall of uterus.	Large subperitoneal, non-hemorrhagic and painless.	Forty applications, negative galvanism.	Tumor reduced about one-third. Symptomatic cure. (Lost sight of.)

OPERATIONS ON THE LIVER.

CASE I. *Echinococcus Cyst of the Gall Bladder; Cholecystotomy; Recovery.*—This case is interesting on account of the infrequency with which hydatids are found developing in cavities lined with mucous membrane (Graham's hydatid disease). Ziemssen, Vol. III, refers to cases where small hydatid cysts have been found in the gall bladder without any trace of the liver hydatid having been discharged into it. Harley also speaks of the infrequency of hydatids of the gall bladder.

J. L. B., age 28. No history of any hereditary disease in the family.

Previous History.—In childhood was always delicate and had all the diseases incident to that age. Till he was 19 years of age was subject to what he termed bilious headaches, these attacks coming on at least once in two weeks. Has always been of a sallow and muddy complexion. At 19 years old moved to Texas, where he spent the next four years on a ranch, at the end of which time he had a severe attack of dysentery, which lasted about one month. A few months after recovering from the dysentery he passed a tapeworm. For the next four years he was in what he considered good health.

Present Trouble.—In the fall of 1890 he began to have attacks of pain in the right hypochondriac region, which were supposed to be biliary colic. One year went by without any further trouble, when the attacks returned with greater frequency till just before he entered the hospital, when they were two a day. These attacks were paroxysmal, consisting of a dull, deep-seated pain, attended with nausea and vomiting. He lay in the dorsal decubitus, with knees drawn on the abdomen. The pain could be relieved on pressure. He was subject to severe constipation, frequently going two weeks without a passage. For about a year back the faeces had been pipe clay in color. The passages from the bowels were slimy and very offensive.

Examination.—Icterus very marked. Pulse, 76. No elevation of temperature. Tongue only slightly furred. A tumor the size of a foetal head was found in the region of the ga'll

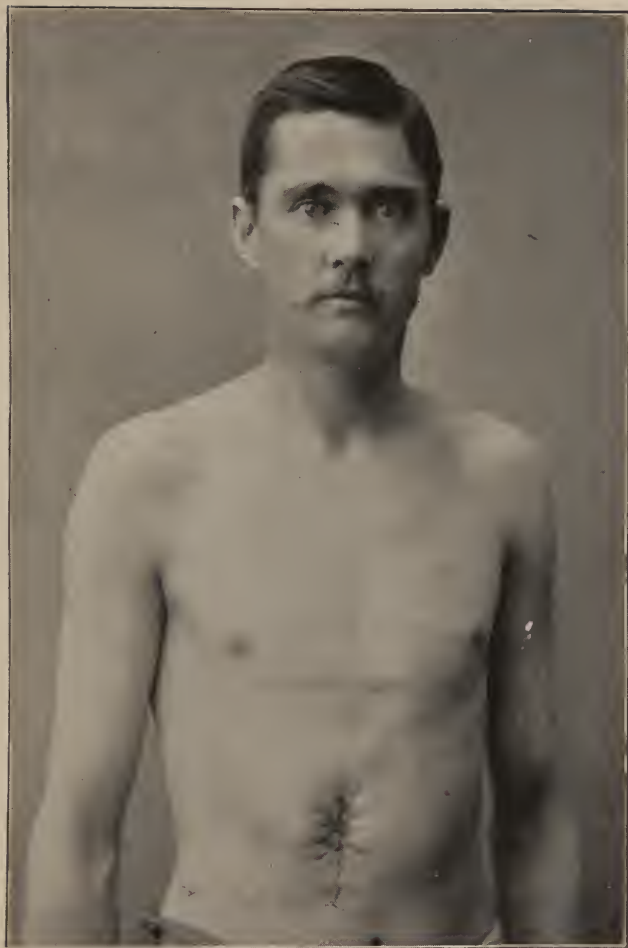
bladder. No superficial œdema over the liver. The tumor was painless. The hydatid fremitus not present.

Operation, February 9.—Ether. An incision five inches long was made over the tumor, beginning at the free border of the ribs and two inches to the right of median line. An oblong tumor about the size of a foetal head was found projecting below the edge of the liver and between the two lobes. Diligent search proved this to be the gall bladder. A needle introduced gave a negative result. An incision was made in the tumor, and it was found to be filled with a brownish gelatinous mass. The incision was enlarged and the edges brought up and stitched to the abdominal wound, and about two pints of this gelatinous material was removed. The bladder was washed out with warm distilled water and a rubber tube left in the wound.

Subsequent Progress.—February 12th, temperature and pulse normal. There was a profuse discharge of normal bile through the fistula. Jaundice entirely disappeared. February 15th—Bowels moved three times during the night; slimy, very offensive and still pipe-clay color. February 23d—Walls found to be adherent to abdominal wound. Stitches removed. Wound granulating and discharge of bile less. March 20th—A small biliary fistula remained. Stools of normal color. No jaundice. April 15th—Fistula closed. Stools normal in color. No recurrence of pain. No jaundice. Patient discharged cured.

A specimen of the gelatinous mass was sent to Prof. William H. Welch of Johns Hopkins Hospital, and appended is his report:

“The gelatinous mass consists of several membranes, presenting in most places a translucent appearance and in others a more opaque whitish or yellowish aspect. Here and there a little hard, gritty material, evidently deposits of lime salts, can be felt. The membranes average 2-3 mm. in thickness. They have a consistence like that of gelatine somewhat softened in water. Microscopically, the membranous material appears clear and transparent, and when seen on cross sections presents an appearance of parallel striae, indicating that the



The accompanying cut represents the patient one year and a half after the operation.

membranes are composed of super-imposed transparent lamellæ. In addition, there is some fine granular material forming a kind of matrix on the inner surface of the membrane. There are also some glistening, irregular, crystalline particles (lime salts). After considerable search, an unmistakable echinococcus hooklet was found. No scolices could be detected. Diagnosis: Echinococcus cyst.

"Remarks—The diagnosis is positive simply from the microscopical appearance of the membrane (translucent, homogeneous, structureless, with parallel striation).

"The finding of a hooklet is also decisive. The type of the echinococcus cyst cannot be determined simply from the specimen, but probably it is the ordinary endogenous form. It is not the so-called multilocular echinococcus."

CASE II. *Calculus of Cystic Duct; Cholecystotomy: Death.*—A. E. G., a physician, age 43.

For five or six years he had been a great sufferer with severe and paroxysmal pain in the region of the gall bladder, and occurring at frequent intervals. His general health was becoming impaired. To relieve his intense suffering he had recourse to chloroform and chloral. It was learned later that he used morphine in large quantities, and was also addicted excessively to the use of alcoholic stimulants. On his admission to the hospital, June 26th, he was suffering severe and intense pain in the epigastric and right hypochondriac regions, preceded by rigor, accompanied by vomiting, and attended by profound constitutional disturbances, bordering on collapse, the case being more like one of perforation of some abdominal viscus, but the history of previous attacks confirmed the diagnosis of gall stones. On examination, no distinct tumor could be made out, but there was much tenderness and a sense of fullness in the right hypochondriac region. Jaundice slight. Fæces normal in color, in which no gall stones could be found. Urine normal, except that it gave Gmelin's reaction for bile pigment.

Operation, June 30th.—Ether. An incision three and a half inches in length was made in the right mamillary line, beginning just below the free border of the ribs. The gall bladder did not appear to be enlarged, and no gall stones could

be felt through it. An aspirating needle was introduced and a straw-colored fluid was withdrawn. The gall bladder was incised; its walls were found to be considerably thickened, but no gall stones could be detected. At this point the condition of the patient became such that it was impossible to carry the operation further in the probing of the cystic duct. The walls of the gall bladder were then brought up and stitched to the abdominal wound, leaving a biliary fistula. A rubber drainage tube was introduced and the wound suitably dressed. Soon after the operation the patient began vomiting, the temperature went up to 103° F., and the pulse became rapid and feeble. On the next day pain similar in character to the old set in, and he sank and died on the third day.

Autopsy.—No evidence of peritonitis. The cystic duct was found enlarged and its walls were quite thick. Three gall stones, each about the size of a large pea, were found impacted in the cystic duct.

CASE II. *Empyema of the Gall Bladder; Cholecystotomy, and Removal of Gall Stones: Recovery.*—Mrs. L. L., aged forty. Mother of four children. Well developed and well nourished, and her general health had always been good until about one year prior to her admission to the hospital, at which time she began to have severe pain in the hepatic region, paroxysmal, and occurring at frequent intervals attended with nausea, vomiting and intense thirst. There was a slight jaundice at times, of varying intensity, and more pronounced after each paroxysm. These paroxysms consisted of severe pain attended with a chill, sweating and fever. She also noticed an indefinite tumefaction on the right side and very tender on pressure. Admitted to the hospital July 10th. Examination showed a distinct tumor in the right hypochondriac region, with marked tenderness, which was increased on pressure, dullness on percussion and distinct fluctuation. Jaundice very deep. Epigastric disturbance severe. Temperature, 103° F.; pulse, 100; respiration, 42. Stools pipe clay in color. Urine normal, except that it gave the re-action for bile-pigment.

Operation, July 12th.—Ether. An incision four inches in length was made in the right mamillary line beginning just

below the free border of the ribs, exposing an enlarged and elongated tumor corresponding to the situation of the gall bladder. No calculi could be felt through it. A needle was introduced and a syringe full of pus was withdrawn, but no calculi could be felt. Sponges were carefully packed in the wound and an incision made into the tumor, from which about a tea-cup full of fetid pus was evacuated.

On introduction of the finger through the incision a second tumor was discovered filled with gall stones, but containing no pus. The supposition was that at some time one of the gall stones had cut through the mucus membrane and had started an inflammation and formation of pus between the inner and middle coats of the gall bladder. There was no communication between the two cavities.

An incision was made in the second tumor, from which 170 gall stones were removed, of a dark brown color, faceted, and varying in size from a millet seed to that of a cherry stone. The walls of the gall bladder were brought up and stitched to the abdominal wound, thus making a biliary fistula. The abscess cavity was irrigated and a rubber drainage tube was left in the wound.

Subsequent Progress.—The temperature never rose above 101° F., nor the pulse above 110. On the third day the jaundice entirely disappeared, the stools became normal in color and a large amount of normal bile was flowing from the tube. At each subsequent dressing for about three weeks several small calculi were found in the gauze. She made a rapid recovery, and with no untoward symptoms. The biliary fistula remained open for three months after she left the hospital, and there has been no recurrence of pain or trouble. Six months from the date of operation the fistula was entirely closed.

CASE IV. Cholecystotomy; Removal of One Large Gall Stone; Recovery.—Mrs. B., aged thirty-two. Has always enjoyed good health and is a mother of four children. In the summer of 1888 she was attacked for the first time with a severe pain in the region of the gall bladder, attended with nausea and vomiting, which lasted about half an hour. She remained perfectly well till the summer of 1891, when she had a second attack, similar in character to the first and lasting

about the same length of time. There were two slight attacks in the next twelve months. Four months prior to her admission to the hospital the attacks were every fourteen days, ague-like in character, preceded by a chill, followed by fever, and sweatings lasting from a half hour to an hour. Epigastric disturbances pronounced. These attacks occurred with



regularity until the last paroxysm, which lasted for ten days and was only relieved by large doses of morphine. On examination there was a sense of fullness in the region of the gall bladder, but no definite tumefaction. There was no jaundice nor had there ever been in any of the attacks. Stools normal in color, on examination of which no gall stones could be found. The urine normal in every respect. From the ague-like paroxysms, attended with epigastric disturbances, a

diagnosis of gall stones was made, and she was sent to the hospital for operation.

Operation.—Ether. An incision four inches in length was made in the right mamillary line beginning at the free border of the ribs. The omentum and transverse colon were found adherent to the under surface of the liver and to the gall bladder. After separating the adhesions, the gall bladder was found not to be enlarged, but its walls were considerably thickened and through which a large calculus could be felt. Sponges were carefully packed in the wound and an incision made into the gall bladder, through which one large stone was removed, weighing one hundred and forty-two grains, and measuring one and one-half inches in its long and one inch in its short diameters. The walls of the gall bladder were stitched to the abdominal incision and a rubber drainage tube inserted. The temperature never rose above 100° F., nor the pulse above 86. She made a rapid and uninterrupted recovery, leaving the hospital two and a half months later with the biliary fistula entirely closed.

OPERATIONS ON THE KIDNEY.

CASE I. *Nephro-Lithotomy; Recovery.*—Mrs. S. G., age twenty-eight. For the past seven years had been suffering with a heavy, dull pain in the left loin, just below the last rib. The pain was of a dragging character, shooting down along the course of the ureter, intermittent, and usually worse after active movements, but not affected by posture. On examination, there was marked tenderness in the left loin, and the patient gave a history of lithiasis. There was a frequent desire for micturition. Specific gravity of urine 1015, acid in reaction, and a dark red sediment in abundance. The color of the urine reddish brown. Microscopical examination showed crystals of oxalate of lime in abundance, blood discs and pus in excess. The blood discs and pus were readily miscible with the urine, promptly deposited from it, and not mingled with mucus. Careful examination of the bladder gave a negative result. A diagnosis of pyonephrosis, due to impacted calculus, was made.

Operation.—Ether. An oblique incision four inches in length was made across the costo-iliac space, beginning about

half an inch below the last rib and to the outer border of the erector spinæ, and extending downward and forward toward the crest of the ilium. The retractors lay open the severed structures to the depth of the wound down to the exposed fatty capsule. The fatty tissue about the kidney was opened up with the fingers and the kidney surface exposed. The surrounding fatty tissues were firm and adherent, owing to the long-continued inflammation. The kidney was systematically examined by the finger and found to be greatly enlarged, and gave evidence of fluctuation. An aspirating needle was introduced and established the presence of a stone, and likewise a syringe full of pus was withdrawn. The pelvis was opened from behind and a large, irregularly-branched stone



was found filling the entire pelvis. The stone was broken and removed in two fragments. About six ounces of pus were evacuated. The wound was thoroughly irrigated, but no attempt was made to close the rent in the renal pelvis. The bleeding which followed the removal of the calculus was small and readily checked by plugging with strips of iodoform gauze.

After Treatment.—For the first week the urine escaped through the wound in the loin, but gradually diminished and

entirely ceased in a few weeks. After the bleeding was checked a rubber tube was inserted and kept in place for several days, after which time it was removed. She made a rapid and uninterrupted recovery, the wound healing slowly by granulation.

CASE II. *Nephrorraphy and Nephro Lithotomy; Recovery.*—Mrs. C. G., age twenty-nine. Had always enjoyed good health, and was the mother of three children. After her last confinement, seventeen months previous, which was very severe and instrumental, she gradually failed in health. About three weeks after the birth of the youngest child, while sitting up in bed, she noticed a tumor in the right side of the abdomen on a level with the umbilicus, which disappeared on pressure and when in the recumbent position, only to reappear when sitting up or lying on the left side. There was very little discomfort and scarcely any pain for about a year afterward, when she was attacked suddenly one day with a severe colicky pain, referred to this movable tumor, and also shooting down along the course of the ureter. From this time on there was always a dull, aching and dragging pain, which at times was very severe. She failed in health, became subject to dyspepsia, sickness, anorexia, diarrhœa, and was becoming greatly emaciated. The attacks of colicky pain were now very frequent, and only relieved by full doses of morphine. She was first seen December 6th, and on examination a tumor freely movable was found on the right side and in the upper part of the abdomen, of the shape and size of a kidney. A subjective symptom of great value was a peculiar, sickening and painful sensation elicited when using pressure on the tumor, analogous to that experienced during compression of the testicle in man or the ovary in woman. The tumor was freely movable, but not beyond the middle line or into the pelvis. On account of the great laxness of the abdominal parietes and the extreme emaciation of the patient, the renal artery could be felt pulsating on the inner concave edge of the tumor. Pain of a neuralgic character was referred to the urethra, with a constant desire to pass water, and frequently associated with hæmaturia. Specific gravity of the urine 1020, acid in reaction, and of a dark red color; abundant sedi-

ment, but not mingled with mucus. Microscopical examination showed crystals of oxalate of lime, red blood discs and pus corpuscles freely mingled with the urine. The bleeding was considerable in amount. A diagnosis was made of movable kidney, associated with an impacted renal calculus.

Operation, December 27th.—Ether. Patient placed on her left side, resting on a hard round pillow. An incision three and one-half inches in length, beginning one-half inch below the last rib and to the outer border of the erector spinæ, and extending downward and forward toward the crest of the ilium. The dissection was carried down to the circumrenal



fat, which bulged into the wound. While the retractors stretched the wound to its utmost capacity an assistant pushed the kidney into the lumbar incision. The fatty tunic was closely adherent to the fibrous capsule. After tearing open the fatty capsule the surface of the kidney was systematically explored with the finger, and a hard and elevated area being made out in the pelvis of the kidney, an exploring needle was pushed into it and the presence of a stone established. The pelvis of the kidney was opened by a blunt instrument and a large pronged calculus and seven small calculi removed.

together with about three ounces of pus. No attempt was made to close the wound in the pelvis, into which a drainage tube was inserted. Fixation of the kidney was secured by means of four silk sutures carried through its fibrous capsule and the margins of the incision.

After Treatment and Subsequent Progress.—There was a free discharge of urine and pus for several days, which gradually ceased, the wound healing by granulation. She made a rapid and uneventful recovery.

CASE III. *Nephrorraphy; Recovery.*—Mrs. H. D., age thirty-seven. She had always been well and strong, and was the mother of three children, the youngest three and a half years old. Some weeks after her last confinement, which was very severe, she was taken with a violent pain in the right side, and on examining the parts she discovered a growth in the upper part of the abdomen, which disappeared on pressure and to reappear on turning on the opposite side. On recovering from her puerperium she noticed on standing that the growth, which she felt in the upper part of the abdomen, would drop to the lower portion of the abdomen on a level with the anterior superior spine, and the range of mobility gradually increased, but never beyond the middle line or into the pelvis. The growth always resumed its normal position on lying down. It was impossible to nurse the child owing to her extreme debility, and four months after her confinement her menstruation returned with great difficulty, attended with severe pain situated in the right side. At the next menstrual period she was seized with a violent pain in the region of the right ovary and tube, of such a severe character that she began to vomit blood, and her menstruation suddenly ceased, since which time she has menstruated vicariously at intervals of three to six months.

On examination, a movable tumor, of the shape and size of a kidney, was found in the upper portion of the abdomen, whose range of mobility extended as far down as the anterior superior spine of the ilium and to the middle line. A peculiar, sickening sensation was elicited on compressing the tumor. A diagnosis was made of a movable kidney.

Operation.—Ether. The patient was placed on her left

side, resting on a hard, round pillow. An incision four inches long was made in the costo-iliac space, beginning just below the last rib and one inch from the erector spinæ on the right side, extending downward and forward. The lumbar fascia being opened, the wound was dilated with retractors, while an assistant with steady pressure held the kidney in the lumbar incision. The viscus was found to be sound and not enlarged. The fatty tunic was closely adherent to the fibrous capsule. Several sutures of large size chromic gut were inserted at the lower end, several at the outer end and several at the inner border, and passed well into the kidney tissue and brought up through the lumbar fascia and muscles. The kidney now no longer fell away when the assistant's hands were removed. The wound was not closed, but packed with iodoform gauze and allowed to granulate. Her recovery was slow and uninterrupted.

Subsequent Progress.—Six weeks after the operation she menstruated, and thinking herself well, returned to her home, some two hundred miles from the city. The patient returned about one year later, stating that since she had left the hospital she had menstruated vicariously four or five times, attended with great pain low down in the abdomen, especially referred to the right side. Previously to her menstruation she experienced a sense of fullness in the epigastric region, followed sooner or later by paroxysms of acute pain, referred to the region of the right ovary. The paroxysms increased in severity and frequency until relieved by vomiting a small quantity of dark and clotted blood. As the paroxysms increased in severity the quantity of vomited blood was increased. There occurred also, at this time, quite an offensive discharge from the uterus, slightly tinged with blood. She continued in this condition for four or five days, suffering extreme pain attended with great prostration. Between the menstrual periods the patient was seemingly well, with the exception of the pain in the region of the right ovary.

On examination, a mass about the size of an egg was felt in the region of the right ovary, exquisitely sensitive to the touch. Vaginal: Uterus subinvolved and cervix lacerated. The same sensitive mass was found in the right fornix.

A diagnosis of diseased adnexæ was entertained, and as the patient had come to the hospital for the devout purpose of having the uterus and appendages removed, so great had been her suffering, an operation was advised and readily assented to.

Operation; Cœliotomy; Recovery.—Ether. A median incision of three and a half inches was made. The mass felt in the right fornix proved to be an enlarged and broken-down ovary firmly adherent to the surrounding tissues. The tube was very tortuous, its canal obliterated, and the walls about 3-8 inch in thickness. These were removed and the wound closed, with drainage. She made a rapid recovery, her temperature never going above $99\frac{1}{2}^{\circ}$ F.

Sufficient time has not elapsed since the operation to say whether her menstruation has been benefitted or not.

CASE IV. *Nephro-Lithotomy; Recovery.*—Mrs. M. B., age 35. Born in London, and twelve years ago came to America on account of her delicate health. Since her childhood she had scarcely ever seen a well day, yet she was the mother of four apparently healthy children. Her mother, two sisters and a brother died of consumption, and she herself had a well-advanced tubercular deposit in the apices of both lungs. For many years she had complained of a dull, aching pain in the left loin. About fifteen months previous the pain in the loin became exceedingly severe, lancinating in character, shooting downward into the left groin and down the thigh. This severe pain was intermittent, recurring about once in two week, and finally becoming as frequent as every two or three days, attended with profound constitutional disturbances. When first seen she had been confined to her bed for several weeks. On examination, a distinct tumor was found on the left side of the size of a foetal head; marked tenderness on pressure, dullness on percussion, cutaneous œdema and fluctuation could be made out. Temperature 104° F; pulse 120; respiration 36. Complete anorexia. Vesical irritation great. The urine was found to be normal in reaction, of a yellowish color and containing pus, which formed a deep sediment not mingled with mucus. An aspirating needle was introduced into the tumor and a syringe full of pus with-

drawn. A diagnosis was made of pyo-nephrosis, due to an impacted calculus.

Operation.—Ether. An oblique lumbar incision three inches long, beginning at the edge of the erector spinæ and half an inch below the lower border of the twelfth rib, and carried downward and forward toward the crest of the ilium. After division of the deep lumbar aponeurosis and the exposure of the circum-renal fat, the kidney was exposed and distinct fluctuation felt. The kidney was found to be greatly enlarged, and after a systematic exploration with the finger, no stone being discovered, an incision was made into the pelvis of the kidney from behind, and about two pints of fetid pus evacuated. On introducing the finger into the abscess cavity, a large, irregular-shaped calculus was found and readily removed. A rubber drainage tube was inserted and the wound suitably dressed. For several weeks there was a free discharge of pus, with decided improvement of her condition. The wound healed slowly by granulation.

ANEURISM.

CASE I. Ligature of the Common Iliac Artery by the Intra-Peritoneal Method; Median Abdominal Incision; Death.—James C., aged thirty-six, a miner by occupation, was admitted to the hospital August 9th, on account of a rapidly-increasing and pulsating tumor situated in the right groin. He had contracted syphilis six years prior. About one year ago, while lifting some heavy timbers, he felt a sudden pain in the right groin, and one month later noticed a swelling at the point of supposed injury, accompanied, as he said, by a throbbing sensation. This rapidly increased in size and was accompanied by considerable pain, so much so that he was compelled to give up his work.

Examination. There was found an inguinal aneurism involving the upper part of the femoral and affecting the external iliac above the origin of the deep epigastric, and occupying the iliac fossa and the lower part of the abdomen. The aneurism was rapidly progressing and was not amenable to pressure or to the old operation. It was fully decided to ligature the common iliac by the intra-peritoneal method, as suggested by Frederick Treves.

Operation, August 11th.—Ether. The bowels having been well evacuated the night before, the field of operation was carefully prepared and the abdominal cavity was opened by a median incision four inches in length, beginning half way between the symphysis pubis and umbilicus and extending up to the umbilicus. The incision being made in the peritoneum, the patient was placed in the Trendelenberg position. The common iliac was found without any difficulty, the intestines gravitating to the most dependent position. The area of the deep wound was packed with sponges and so cut off the field of operation from the general peritoneal cavity. The right common iliac was seen in close relation with the vena cava and both common iliac veins. The external iliac artery was found to be diseased as high up as the bifurcation of the common iliac artery. A point about one inch above the internal iliac artery was selected as the point of ligaturing. The peritoneum over the artery was well exposed and was divided to the extent of an inch. The sheath of the vessels was next picked up and nicked, and a solid aneurism needle, carrying a stout chromic acid catgut ligature, was passed between the artery and the vein from without inwards. The ligature was tied so as to stop all pulsation in the aneurism but not to rupture the inner coat of the artery. The abdominal wound was closed without drainage. The limb was evenly and thickly enveloped in cotton from the toes upward. He was placed in bed, surrounded by hot water bottles and injection of hot water and whisky administered per rectum, and the limb kept elevated.

Subsequent Progress.—Ten hours after the operation, slightly nauseated from the ether. Temperature, 99° F.; pulse, 110. Complained of numbness and tingling in the entire limb, all parts of which felt warm except the toes, which were cold and bluish.

August 12th, 9 a. m.—Pulse, 115; temperature, 100° F. No nausea or vomiting. Had some sensation in the foot and the limb felt warm to the toes. 9 p. m.—Pulse, 120; temperature, 101° F. Sensation and warmth gradually improving.

August 13th, 9 a. m.—Pulse, 130; temperature, 100° F. Pain in limb considerable. 9 p. m.—Pulse, 140; temperature,

99° F.—Entire limb felt quite warm and sensation almost normal as far as the toes. Stimulants administered.

August 14th, 9 p. m.—Pulse, 160; temperature, 98° F. Stimulants administered. The patient gradually sank and died seventy-two hours after the operation. There was no gangrene of the limb, and collateral circulation had become established.

Autopsy.—No signs of peritonitis and no secondary hemorrhage.

Remarks.—The advantage of this operation is that it is simple and involves but little time. The vessel can be easily and freely exposed, the ligature accurately applied and the needle passed without risk of injuring the vein. The extent of the diseased artery can be made out and the diagnosis confirmed.

APPENDICITIS.

CASE I. Operation; Recovery.—M. L. G., male, aged twenty-five. Was first taken sick February 3rd, eight days ago, with pain all over the abdomen, but on the fourth day became localized in the right iliac fossa and was quite severe. Admitted to hospital February 11th. Temperature, 102° F.; pulse, 110, and was suffering considerable pain.

Examination.—There was a distinct tumefaction in the right iliac fossa and resistance to the touch over an area of about three inches in length running parallel to Poupart's ligament. The œdema was slight, but the tenderness and pain was severe, markedly so at a point about midway between the anterior superior spine of the ilium and umbilicus. The right thigh was flexed on the hip.

Operation.—Ether. An incision was made over the tumefaction almost parallel with Poupart's ligament. The tissues in the abdominal wall were found matted together. On carrying the incision a little deeper pus escaped to the amount of several ounces. The appendix was found adherent to the head of the colon and easily separated. A silk ligature was thrown around the base of the appendix and removed together with all its surrounding inflammatory tissues.

The free end of the appendix was gangrenous and had sloughed away. The abscess cavity was sponged dry and packed with iodoform gauze.

Subsequent Progress.—There was considerable suppuration for some days, with gradual shrinking of the cavity, till it was entirely closed. He was discharged from the hospital cured, in twenty-four days.

CASE II. Operation; Death.—L. B., aged twenty-nine. Previous health had always been good, with the exception of several attacks of severe pain in the right iliac fossa during the past few years. The present illness began twelve days ago with severe pain in the right iliac region, attended with chills and slight fever. Bowels have been confined, but not absolute. The pain increased and a swelling appeared in the same region. On entering the hospital May 20th, he was almost in a state of collapse and an operation was performed with little hope of success. Temperature, 99° F.; pulse, 130; respiration, 32; abdomen tympanitic. There was an area of induration and marked tenderness on the right side. Liver dullness absent, and he was in a cold and clammy sweat.

Operation.—Ether. An incision three and a half inches was made along the outer border of the right rectus muscle parallel with the median line. The deeper muscles were infiltrated, the omentum and caecum were bound down in the iliac fossa by firm adhesions. An abscess containing about one ounce of pus was found in the region of the caecum, and the general abdominal cavity had become infected, and a suppurative peritonitis resulted. The appendix was not removed. After thorough irrigation with warm water and an iodoform tampon was placed in the wound, the external incision was partially closed. The temperature gradually rose, the pulse became rapid and feeble and he died in about ten hours after the operation. No autopsy.

CASE III. Operation; Recovery.—P. O. D., male, aged twenty-eight. Admitted to hospital June 1st. General health good. His present illness began ten days prior to his admission, with general tenderness in the abdomen. At first the abdominal pain was general, and it continued of a dull and constant character, occasionally severe, and markedly

so in the right lower abdomen. At the end of seven days he noticed a swelling in the right iliac fossa, at which time he had a chill, followed by a high elevation of temperature. Bowels constipated. Two days later nausea and vomiting set in.

Examination.—Temperature, 102.6° F.; respiration, 30; pulse, 118. A tumor, tender to pressure, was felt in the right iliac fossa low down, associated with general abdominal tenderness and muscular rigidity.

Operation.—Ether. An incision four inches long was made extending upwards from the middle of Poupart's ligament. An abscess cavity containing about three ounces of pus was opened, the caecum forming the floor of the abscess. The appendix was found terminating in this abscess, which was removed, after tying off the base by a silk ligature, together with the inflammatory product. The wound was packed with iodoform gauze and allowed to granulate. He made a rapid and uninterrupted recovery, having been in the hospital twenty-two days.

CASE IV. *Operation; Death.*—Charles B., aged twenty-one, butcher by trade, and a young man of robust health. January 24th was seized with great pain in the abdomen shortly after his dinner, more marked in the right iliac region. Three days later he noticed a swelling in the same region. His bowels had been constipated, but not absolute. This was the third attack of the same nature in the past year. When admitted to the hospital, February 1st, he was in a state of collapse. Temperature 103° F.; pulse 130; respiration 35. Right thigh flexed on the abdomen. A distinct tumor was found in the right iliac fossa, fluctuating and almost breaking through the integument. Tympanites great, attended with severe abdominal tenderness. Tongue dry and parched. As soon as possible after his admission he was put under ether and an incision was made over the site of the tumor. The tissues were gray and infiltrated with serum. An abscess of the most foul character, showing traces of faecal matter, and containing about a pint of pus, was opened and evacuated. The pelvic cavity was found to contain pus; this was washed out with a warm three per cent. carbolic solution, and a large

rubber drainage tube inserted, and the external wound partially closed. The pulse was very rapid and weak at the close of the operation. The temperature gradually rose, and he died thirty-six hours after the operation. No autopsy.

CASE V. Recurrent Appendicitis; Operation; Recovery. J. W. J., male, age seventeen, a sickly boy. Was admitted to the hospital February 23th. On February 8th, on coming home from school, complained of pain in the right lower abdomen. He remained in bed three days, at the end of which time he had a chill, followed by a high fever. He gradually became worse, and started for Salt Lake City on February 24th. His journey consisted of a stage ride of sixty miles over the mountains, and all the while the pain was most intense. He reached the hospital twenty days after the onset of the attack, and a distinctly fluctuating tumor was found in the right iliac region of about the size of an orange. Temperature 99° F.; pulse 110; respiration 24. No general abdominal tenderness except on pressure in the region noted. Bowels not constipated.

Operation.—Ether. An incision three inches long was made over the site of the tumor, beginning about two and a half inches above the middle of Poupart's ligament and parallel to the median line. An abscess cavity was opened and about four ounces of pus was evacuated. The omentum was found firmly adherent to the cæcum. The appendix was not removed. The wound was sponged dry and packed with iodoform gauze. Twenty-eight days later the wound had entirely healed by granulation, and the boy went home March 26th. He remained well for about four weeks, when there was a repetition of the same symptoms, and he again returned to the hospital. On May 10th, at 9 o'clock in the evening, he was operated on the second time. The same incision was made and a careful search was made for the base of the appendix which was found by carefully examining the caput coli, and the appendix was traced upward and inward to an inflammatory tumor. The base of the appendix was ligated with a silk ligature, and the appendix, with the entire inflammatory tumor, was removed, after carefully separating the adhesions, but not without considerable difficulty. The base of the

appendix was disinfected by cautery. The wound was sponged out without irrigation and packed with iodoform gauze to the external wound. He made a rapid recovery, and union was complete twenty-nine days after the operation.

CASE VI. *Operation; Recovery.*—J. C. B., male, a healthy young man, aged twenty-four, had an attack of severe abdominal pain last May, lasting two days. His health remained good till October 26, at which date he was seized with severe abdominal pain, but most intense in the right lower abdomen, and which was attended with nausea and vomiting. The pain remained severe for several days, but he still kept at his work as a butcher. He was admitted to the hospital November 8th, thirteen days from the beginning of his illness, able to walk, though looking worn. Five days prior to his admission he attended a ball and danced several times, but was compelled to return to his home early in the evening. On admission his pulse was 96; temperature 99.5° F.; respiration 23. Marked tenderness existed at the typical situation, and on deep palpation a small tumor could be felt. The abdominal muscles were very rigid and the belly flat.

Operation, November 9th.—Ether. The peritoneal cavity was opened by a four and one-half inch incision about one-half an inch outside the linea semi-lunaris. No inflammatory products were seen till finding the base of the appendix and following this upward and inward to a small inflammatory tumor. The appendix was ligatured at its base, and there being only a few adhesions, the appendix, together with the inflammatory tumor, was removed with ease. The wound was packed with iodoform gauze and the upper part of the external incision was sutured. He left the hospital in thirty-three days. The end of the appendix terminating in the inflammatory tumor was showing signs of sloughing, and there were only a few drops of pus. This in a few days would undoubtedly have been a large abscess.

CASE VII. *Operation; Recovery.*—P. C., a sturdy Swedish girl, age twenty, was first seen March 1st, after she had been suffering severe abdominal pain for three days. This pain was continuous and remained general till March 3d, when it became localized in the right iliac fossa, in which region there

was great tenderness on pressure, attended with slight nausea and vomiting. Temperature 100° F.; pulse 112; respiration 24. On March 5th the pain and tenderness had almost ceased and she sat up for a while, contrary to all advice. Temperature 99.5°; pulse 100. The general appearance of the patient was good, and on the whole it seemed that she was on the road to recovery, when on March 6th the symptoms returned with greater severity, ushered in by a chill. Temperature 103° F.; pulse 126; respiration 30. The point of maximum intensity was the typical point. The bowels had been constipated since the attack, but not absolute. There was no marked muscular rigidity. Though no tumor existed, yet the symptoms were becoming more aggravated and the local signs were clearly those of a sharp inflammatory process.

Operation, March 8th.—Ether. An incision four inches long was made just to the outside of the linea semi-lunaris and the peritoneal cavity opened. The appendix was found lying deep behind the caput coli surrounded by an inflammatory tumor, and attached to the small intestines. The base of the appendix was severed after having been ligated. The appendix ended in the inflammatory tumor, which by careful dissection was opened and about a dram of pus was caught on a sponge. The appendix was removed with difficulty on account of its firm adhesion, the end of which was quite destroyed. In this abscess cavity, at the opening of the appendix, was found a fecal concretion about the size of a pea. Strips of iodoform gauze were placed in the deep wound, the seat of the abscess, and allowed to protrude through the external wound, which was half closed by sutures. Usual dressings applied, and two days afterwards the evening temperature was 99° F.; pulse, 90. She left the hospital on the thirty-second day.

CASE VIII. *Operation; Recovery.*—J. C., aged eighteen. Came to the office to consult concerning a tumor low down on the right side of the abdomen, having been sick for several days. He was taken suddenly with severe pain in the right side attended with nausea and vomiting. The pain continued all that day and the next and on the following morning he had a severe rigor, followed by a high and delirious fever.

On the fourth day his condition was much improved, except that the pain in the right side continued. On the evening of the sixth day he noticed a swelling in the right iliac fossa. On the afternoon of the seventh day, feeling much better, he left his home for the office. On coming into the office he rather dragged himself than walked and was bending forward and to the right side, with his hand on the abdomen. His face bore the expression of intense suffering and was of that peculiar hue so characteristic of septic-intoxication. The trouble was suspected at once, and on examination a distinct tumefaction about the size of the fist was discovered in the right iliac fossa, fluctuating and exquisitely tender on pressure. Temperature, 102° F.; pulse, 130; respiration, 36. No tympanites. Muscular rigidity great. Bowels severely confined. He was sent to the hospital for operation, but did not reach there till 9 o'clock in the evening.

Operation, November 10th, 9:30 p. m.—Ether. An incision was made over the tumor and about two teacupsfull of foul-smelling pus was evacuated, but no attempt was made to remove the appendix that evening. The abscess cavity was irrigated with warm water, sponged dry and packed with iodoform gauze. On the second day, his condition being greatly improved, he was again put under ether and the appendix searched for, which was easily found penetrating the abscess cavity and gangrenous at its extremity. A ligature was thrown round its base and removed. The usual dressing was applied and there was a free discharge of pus for several days, which gradually diminished, the wound healing by granulation. He left the hospital in twenty-five days.

CASE IX. *Operation; Recovery.*—J. J. G., male, aged thirty-one, of heavy build and excellent health. While on his way from Pocatello to this city, he was suddenly seized with severe abdominal pain attended with nausea and vomiting. His illness continued severe and on reaching this city, September 10th, was taken to the hotel, where he was first seen. He was visited frequently during the day and acute appendicitis was suspected. His temperature was 102° F.; pulse, 118; respiration, 28. The pain in the right iliac region increased and next morning his temperature was 103.5° F.,

pulse, 124; full and bounding. Great tenderness in the usual situation and he had the looks so characteristic of beginning sepsis. Operation was advised to be done without delay, which was consented to and he was removed to the hospital.

Operation, September 12th.—Ether. No distinct tumor could be felt, but there was considerable muscular rigidity. An incision about five inches was required on account of the thickness of the abdominal walls, to the outer side of the linea semi-lunaris. The appendix was found lying to the outside of the colon, about three inches long and about the size of the index finger, the outer half gangrenous but not perforated, and no pus had formed. The appendix was ligated at its base and was completely removed. The cavity was sponged dry and packed with iodoform gauze. The bowels acted on the second day without either a saline or an enema. He left for home in thirty-five days from time of operation.

CASE X. *Operation; Recovery.*—Thomas C., age twenty-five, a healthy young man, had had during the past year and a half several attacks of a severe abdominal pain, and their nature remained unknown till he was seen in his present illness by Dr. Carter, of Fort Bridger, Wyoming. He had three attacks, all of which were in the time of six weeks. On October 10th he had a fresh attack, when for the first time he had medical aid, occurring under the observation of Dr. Carter. The attack lasted about eight days, after which time he was able to be around, but there remained a dull, constant pain in the right iliac region. Believing him to have what is called the recurrent or relapsing appendicitis, an operation was advised, and he came to the hospital for that purpose. On his admission, October 28th, his temperature was 99° F.; pulse 86; respiration 18. The local pain had almost disappeared, but there was a characteristic tenderness in the typical situation when deep pressure was used. No tumor could be felt. He had not fully recovered from the attack; had lost flesh and was anæmic. He looked a man forty-five years old. Believing that he had a case of relapsing appendicitis, and relying upon the accurate observations of Dr. Carter, an early operation was decided upon as the safest plan. To this the patient readily assented, and on November 4th the operation was per-

formed. The appendix at first was not easily found, but was finally discovered deep in the pelvis, ending in an inflammatory tumor, which was adherent to the common iliac artery. The intestines were carefully protected by sponges and the base of the appendix ligated and cut. The appendix was finally removed by slow dissection, and a small abscess cavity opened, containing about half a drachm of pus, which was caught on a small sponge. The abscess cavity was sponged dry and strips of iodoform gauze carried to the seat of the abscess. The external wound was left open. His condition improved from the time of the operation, and he made an unbroken convalescence, and when he left the hospital he was in good spirits, and had gained much in flesh. He was in the hospital thirty-one days.

CASE XI. *Operation; Death.*—E. I., female, a rather delicate child of nine years of age, was attacked by severe abdominal pain, which was at first regarded and treated as colic, till she was seen by Dr. Shores, of Provo, December 26th, who at once strongly suspected acute appendicitis. At the time the child was seen by Dr. Shores she had already been sick five days, suffering the most exquisite pain, especially marked in the right iliac fossa. Her temperature was 103.5° F.; pulse 128; respiration 33. Nausea and vomiting were excessive. She was taken at once to Salt Lake City and conveyed to the hospital, accompanied by Dr. Shores, and the operation was performed that night. There was a distinctly fluctuating tumor in the right iliac fossa. She had the gray, tired look so characteristic of sepsis. Her pulse was 130, and temperature 104° F.

The operation was performed without delay, with the hope of saving her life. The appendix was found gangrenous and perforated near its base. A large abscess cavity was opened, in which was found an orange seed. The appendix was removed and the cavity washed out and packed with iodoform gauze. The pulse was very rapid and weak after the operation, and the temperature gradually rose, and she died about ten hours after the operation. No autopsy.

HERNIA.

There were nine operations for hernia, as follows: inguinal, six; femoral, two; ventral, one.

Of these operations, there were eight recoveries and one death (strangulated). In the ordinary cases the method of operation was as follows: A two and a half to three and a half inch incision was made in the line of the inguinal canal. The sac having been exposed just below the external ring, was cut across, and the intestines returned to the abdominal cavity. The sac was then ligated as high up as possible. The pillars of the ring were then brought together with interrupted catgut sutures, embracing the conjoined tendon as well as the external and internal pillars. The external wound was closed with a small rubber drain at the lower extremity. Antiseptic dressing with a hernia bandage was applied and allowed to remain about five days. A light truss was worn as soon as the cicatrix had become firm. The average time of the cases in the hospital was about four weeks.

Mortality.—The only fatal case was one in which the operation was performed for prolonged strangulation. The patient, being in his seventy-second year, was almost in a state of collapse at the time of the operation. Time has not been long enough to judge whether the operations have been beneficial or not. The ordinary cases have been arranged in a tabular form, giving only the important points, while those of unusual interest have been given with more or less detail.

CASE I. *Strangulated Inguinal Hernia; Operation: Death.*—T. J. B., age seventy-two, had a hernia twenty-seven

years, which had become strangulated two days previous to his admission. At the time of the operation there was a tumor of the size of the fist in the left inguinal region, which was very tender and resonant on percussion. Temperature 102° F.; pulse 140. The whole abdomen was tympanitic and distended. The operation was performed July 31st, soon after his admission. A knuckle of small intestine, about six inches in length, greatly congested, but soon regaining its normal color on removing the constriction, was found in the hernial sac, together with a small amount of bloody serum. The intestine was returned to the abdominal cavity and the sac ligated high up and removed. The wound was closed by the usual method. The patient's condition was very bad at the time of the operation, but he rallied under stimulants. On the following evening his temperature rose to 104.5° F., and continued high, and on the third day death ensued.

CASE II. *Ventral Hernia; Operation; Recovery.*—Mrs. E. P., age thirty-five, was operated on one and one-half years prior to her admission to the hospital for a large ovarian tumor. Admitted May 27th, and on examination there was found a large visible tumor, in which, after *cœliotomy*, the recti and fascia had separated along the line of incision, leaving the abdominal contents separated from the external world by only a covering of peritoneum, fat and skin.

Operation.—Chloroform. After opening the sac it was found to contain the omentum and greater part of small intestines, all adherent to each other, and to a large hernial aperture, circular in form, and situated in the median line just below the umbilicus. After liberation of the adhesions, which was only accomplished after considerable difficulty, the fibrous margin of the aperture was split all around by the knife to obtain fresh surfaces for union. Silver wire sutures were used, embracing both the skin and the margin of the hernial aperture. Superficial silk sutures were used, and the wound closed without drainage. The silver wire sutures were removed on the eleventh day, and she returned home five weeks after the operation, wearing a suitable abdominal support. Chloroform was used in preference to ether because of the severe after effect experienced in her former operation, and its use was followed by only slight nausea and vomiting.

CASE III. *Large Irreducible Scrotal Epiplocele; Operation; Recovery.*—The patient, a German, aged thirty-nine, very fleshy and weighing 210 pounds, was admitted to the hospital in February, 1890, with an irreducible scrotal epiplocele, about the size of a child's head. At the operation the sac was found to contain a large mass of adherent omentum, which was separated with great difficulty and returned to the abdominal cavity. The testicle on that side was found diseased and was removed together with the cord high up. The sac was ligated high up and then removed. The external incision was carried from the spine of the pubes up to within an inch and a half of the anterior superior spine of the ilium. Six or eight interrupted stitches were taken on the upper side of the wound, binding into one thick edge the skin, the external abdominal aponeurosis, including the inner pillars of the ring, the transversalis and internal oblique muscles and conjoined tendon. Six or eight stitches were taken on the lower side of the wound, binding together into one thick edge the skin and Poupart's ligament, including below the outer pillar of the ring. Iodoform gauze was packed in the resulting open canal, which slowly filled by granulation. He left the hospital in nine weeks' time from the operation, wearing a suitable abdominal support. The history of this case has been followed up for three years, and in February, 1893, the result was perfect. The patient has not worn an abdominal support for nearly two years.

CASE IV. *Incarcerated Femoral Hernia; Operation; Recovery.*—The patient, a woman, fifty years old, had a femoral hernia for thirty years, which had been reducible until four days previous to her admission to the hospital, at which time the tumor was about the size of the fist, very tender on percussion. The hernia could not be reduced by gentle taxis or by the employment of ice bags. An operation was decided on without delay, for the hernia showed signs of positive strangulation.

Operation, March 30th.—Ether. An incision two inches long was made near the inner side of the neck of the tumor. The superficial fascia was divided and a hernia knife was introduced to the neck of the tumor, through the crural ring,

DIAGNOSIS	AGE.	SEX.	DURATION.	SIZE.	TRUSS, (WORN)	OPERATIONS.	DEAIN- AGE.	TIME IN HOSPITAL.	WOUND HEALING.	REMARKS.
Case V. Oblique inguinal of right side. Incarcerated 4 days.	75	M.	30 years.	Fist.	Truss.	Sac liga- tured high up and re- moved.	Rubber drain.	30 days.	Primary Union.	
Case VI Oblique inguinal of right side	43	M.	2 years.	Fist.	Truss.	Usual meth- od.	Rubber drain.	25 days.	Primary Union.	Omentum tied off.
Case VII. Oblique inguinal of left side.	14	M.	Congenital	Walnut	None.	McBurney's.	Packed with iodoform gauze.	29 days.	Wound healed by granula- tion.	This is the second oper- ation the first was perform- ed 4 yrs. pre- viously.
Case VIII. Oblique inguinal of right side.	25	M.	12 years.	Egg.	Truss.	Usual meth- od; unde- scended testicle.	Rubber drain.	33 days.	Primary union; tube sin- us.	Testicle re moved.
Case IX. remoral, right side. Incarcer- ated 5 days.	23	F.	5 years.	Egg.	None.	Usual meth- od.	Rubber drain.	27 days.	Primary union.	

and insinuated between the neck of the tumor and Gimbernat's ligament, cutting inwards, dividing a few fibers of the ligament. This done the tumor was reduced *en masse* without opening the sac. A stout catgut ligature was thrown around the neck of the sac high up and removed. The incision was closed and a small drainage tube placed in the lower end of the cut. Union by first intention. She left the hospital in four and a half weeks' time.

UNCLASSIFIED.

CASE I. *Encysted Peritoneal Dropsy; Cœliotomy; Recovery.*—John H., age seventeen, was admitted to the hospital May 30th. Had noticed a fullness in the epigastric region for about one and one-half years, which of late had rapidly increased. No satisfactory history could be obtained from the boy. No history of an injury.

Physical Examination.—There was a marked tumefaction occupying the median line and situated above the umbilicus. No degree of mobility was present. Fluctuation free. There was resonance between the pubes and the tumor. No distinctly outlined cyst wall could be made out. Dullness extended on percussion to both sides and from above the ensiform cartilage to just above the navel.

Operation.—A median incision four inches in length, midway between the umbilicus and ensiform cartilage, evacuating about six quarts of a clear, limpid fluid. Drainage tube inserted in the lower part of the wound, which was allowed to remain for several days, there being a continual discharge of the fluid. The tube was removed on the fifth day, the fluid having entirely discharged itself. He left the hospital five weeks after the operation, with no accumulation within the abdominal cavity.

CASE II. *Chronic Suppurative Salpingitis; Cœliotomy; Recovery.*—Mrs. M. C. A., age twenty-eight, had been in poor health for six years, during which time she had been confined to her bed for the greater part of the time. She had never had any children, and her present illness dated from a miscarriage six years previous. Admitted to the hospital June 22d.

Physical Examination.—She was reduced almost to a skeleton. Skin very sallow; temperature 102° F.; pulse 110;

respiration 30; tongue dry; cold and clammy sweat. For several years had had severe pains in the lower part of the abdomen, accompanied by a white discharge from the cervix. Her menstrual history had been very irregular. A very tender swelling about the size of a large orange was found in the right side and fluctuating. Abdomen markedly tender and slightly tympanitic. Nausea and vomiting. Vaginal: The same fluctuating tumor was found in the right fornix.

Operation.—Chloroform. A four-inch incision (median) below the umbilicus. On the right side, deep down in the pelvis, was a mass the size of an orange, to which the intestines were bound by old and firm adhesions. Here and there the intestines were bound together with well-organized fibrinous exudation. The mass was found to be an enlarged suppurating Fallopian tube and right ovary. The adhesions were very firm and vascular, and on this account it was found impossible to remove the suppurating mass. The abscess cavity was aspirated and an incision made into its walls, which were then stitched to the lower part of the abdominal incision, and a drainage tube inserted. She was put in bed in a very critical condition, but rallied well under stimulants. There was a free discharge of pus for several days; the tube was removed on the tenth day and the wound thereafter packed with iodoform gauze. She made a slow recovery, and left the hospital August 18th, cured.

CASE III. Chronic Suppurative Salpingitis; Ceoliotomy; Death.—Mrs. M. V., age twenty-nine, was on her way from San Francisco to Chicago, when she was taken with a severe pain in the lower abdomen, preceded by a rigor and attended with nausea and vomiting. She was taken to the hotel, where it was learned that she had suffered for about nine years with attacks of sharp, shooting pains in the lower portion of the abdomen, accompanied by a white discharge from the cervix. Her menstrual history for several years had been irregular, and she had been addicted severely to the use of morphine.

Physical Examination.—Temperature 103° F.; pulse 120; respiration 26. Tongue dry and parched; skin sallow; abdomen remarkably tender and tympanitic. A tender swelling was found in the region of the right tube and ovary, about the

size of a cocoanut. Vaginal: The same tender swelling in the right fornix and fluctuating.

Treatment.—An ice coil to abdomen, when the symptoms quickly became less, and on the following day (November 14th) she was taken to the hospital. November 20th the pain and tenderness, now localized in the region of the right tube and ovary, recurred with greater severity than ever. Nausea and vomiting. Temperature 104.7° F.; pulse 138; respiration 29.

Operation, November 20th.—Chloroform. A four-inch median incision was made below the umbilicus, and on the right side, deep down in the pelvis, was a mass about the size of a foetal head, bound to the surrounding organs with firm and old adhesions. The mass was found to be an enlarged suppurating Fallopian tube and ovary. On account of the firm and vascular adhesions the tube and ovary were not removed, but after evacuating the abscess cavity through an incision, first carefully protecting the peritoneal cavity, the walls of the abscess cavity were stitched to the lower part of the abdominal incision and a rubber drainage tube was inserted. Intestinal paralysis set in on the fifth day, and in spite of anything that could be done she sank and died on the tenth day after the operation. Cause of death, intestinal paralysis.

CASE IV. *Pistol Wound of the Abdomen: Lumbar Abscess; Lumbar Incision; Recovery.*—H. P., male, aged eleven, on October 12th, was accidentally shot in the abdomen with a 32-caliber pistol. He was not seen until three weeks after the injury, when he was brought to the hospital.

Physical Examination.—There was a bullet wound four inches to the left and on a line with the umbilicus. His left thigh was flexed on the abdomen. All the symptoms so characteristic of sepsis were present. Temperature, 102.7° F.; pulse, 130. Abdomen flat and hard. No tympanites. Bowels have moved regularly. A tender swelling was localized in left lumbar region into which an aspirating needle was introduced and a syringe full of pus withdrawn. With the needle as a guide an incision two and a half inches long was made into the left lumbar region, opening up an abscess cavity along the Psoas muscle, from which about one pint of pus

escaped. In this cavity was found the ball, together with a small piece of the clothing. There was a profuse discharge of pus for about two weeks, which gradually ceased. His recovery was slow, regaining the full use of his left leg. He left the hospital in six weeks' time.

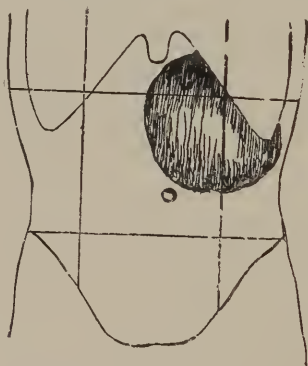
CASE V. *Cyst of the Pancreas; Cœliotomy; Recovery.*
—William W. Y., aged forty-five, miner by occupation. Father and mother both living. Grandparents lived to an old age. Two of his sisters, twins, died within a few days of each other of cancer of the stomach, at the age of thirty-four. About one year prior to his admission to the hospital he noticed a swelling in the right side of the abdomen, which for the last three months had been rapidly increasing and attended with considerable pain. Admitted to the hospital July 27th.

Examination.—Has lost flesh rapidly during the last three months. Complexion of an ashen hue. A tumor occupying the whole epigastric and left hypochondriac regions, and most prominent to the left of median line, about three and a half inches below the ensiform cartilage. The swelling is smooth and round, non-pulsating, and no pulsation imparted to it from its proximity to the abdominal aorta. Dullness extends from the left nipple to half an inch above the umbilicus in front and posterior from the eighth to the twelfth ribs on the left side. Resonance between tumor and liver. Heart displaced upwards. Liver normal in size and no ascites. Tenderness on pressure and considerable pain of a gnawing character. The tumor has been steadily increasing in size. There is absolutely no history of an injury. Alvine discharges normal. Temperature, 98 4-5° F.; pulse, 76. Urine acid, specific gravity 1,024. No traces of albumen or sugar, but large amount of phosphates. A needle was introduced, which moved up and down with respiration, and drew off a dark brown turbid fluid; re-action alkaline; specific gravity 1010; rich in albumen, forming on boiling and slightly acidifying a solid coagulum. Tasteless and odorless. On standing, a one-half dark precipitate goes down—the upper part turbid and of a yellow color. The precipitate consists of blood cells, and débris of cells. The fluid does not contain

bile. When boiled with equal parts of starch-paste it does not convert the starch into sugar. It forms only a slight emulsion with olive oil.

A specimen of this fluid was sent to Dr. W. T. Councilman, of Johns Hopkins Hospital, and appended is his report:

"The fluid has a dark brownish color, which is due to admixture with blood. It contains no bile. There is no evidence of hydatid disease. On microscopic examination it contains numerous bacteria of putrifaction and large numbers of red corpuscles. There are also a few other elements present, but they are so altered by putrifaction that I cannot say what their character is. The general appearance of the fluid resembles that from cysts of the pancreas, but the concretions so often found in this are not present. I should incline to the opinion that the fluid rather comes from a pancreas cyst than from the liver."



Operation.—A six-inch incision was made over the most prominent part of the tumor, through which the tumor could be seen and felt, presenting a smooth, whitish and glistening surface. An aspirating needle was introduced and about three quarts of a dark brown fluid were drawn off. Before making an incision into the cyst it was brought up and stitched to the abdominal wall, and an incision was then made into the cyst, the walls of which were found to be about an eighth of an inch in thickness, rough and of a dark brown

color on the inside. Two more quarts of the same fluid were drawn off. The cyst was not adherent to the omentum or peritoneum. The interior of the cyst was explored, the index finger passing directly backward to the tail of the pancreas, which could be felt through the walls of the cyst. A rubber drainage tube was inserted and packed about with iodoform gauze. The cyst discharged this dark brown fluid for several weeks. The patient made a rapid and uninterrupted recovery from the operation, and left the hospital September 24th.

It will be of interest to record here a case of intestinal obstruction, due to that somewhat rare condition of *volvulus* or twisting of the sigmoid flexure:

CASE VI. *Volvulus; Autopsy*.—J. G., age twenty-six, came to the hospital on the night of November 7th, and died suddenly, shortly after his admission, while going to stool. An accurate history of his condition could not be learned, save a little from a friend of his. He was taken, ten days prior to his coming to the hospital, with colicky pains in the abdomen and persistent vomiting. His bowels had not moved for several days, and believing himself constipated, he had been taking freely of cathartics of all kinds, especially large doses of salts. When he was seen at the hospital his skin was pale and cold, his pulse small and rapid. The abdomen was enormously distended, and he was vomiting incessantly. His breathing was difficult and his temperature was sub-normal. When the attendant was out of the room he got up from his bed to go to stool, and fell dead just as he reached the closet.

Autopsy.—Intestines found greatly congested, enormously distended and filled with fluid. The colon measured seventeen inches in circumference and contained a great quantity of fluid. The obstruction was in the sigmoid flexure at the left sacro-iliac symphysis, where the gut ends in the rectum. The twisting of the gut was twice around its axis from left to right, and above the obstruction was greatly dilated and elongated. No signs of peritonitis. The mesentery was of abnormal length. Where the bowel was twisted the lumen of the intestine was narrowed (stenosis).

OPERATIONS ON THE HEAD, FACE AND NECK.

	NO.	RECOV- ERED.	DIED.
(A) OPERATIONS UPON THE HEAD:			
(a) Compound depressed fracture of skull.....	2	2	....
(b) Mastoid necrosis.....	7	7	....
(B) OPERATIONS ON THE FACE:			
(a) Neoplasms—			
Epithelioma of tongue	4	3	1
" lip.....	6	6	....
Carcinoma of superior maxillary bone.....	2	2	....
Recurrent fibromata of ears....	1	1	....
Sarcoma of parotid	1	1	....
(b) Deformities—			
For hare lip.			
" " single.....	4	4	....
" " double complicated....	1	1	....
Plastic.....	7	7	....
(c) Eneucleation of eye.....	9	9	....
(C) OPERATIONS ON THE NECK:			
Oesophagotomy for foreign body...	2	2	....
" " stricture.....	1	1	....
Carcinoma thyroid body.....	1	1	....
Abscess " " 	1	1	....
Lipoma.....	2	2	....
Tubercular lymphadenoma.....	10	10	....
(D) Miscellaneous	27	27	....

(A)—OPERATIONS ON THE HEAD. (a)—HEAD.

Although the number of cases here reported are only two, where an operation upon the skull was necessary for traumatism, yet they add to the evidence which has been collected during the last eight or ten years in favor of the EARLY use of the trephine in ALL cases of depressed fracture of the skull. Trephining was largely practiced as a prehistoric religious rite, and must have been harmless, judging from the great number of skulls which have been found with trephine openings healed be-

fore death. Prior to the nineteenth century the trephine was used frequently, and it is said that Chaborn trephined Philip of Nassau for epilepsy twenty-seven times, and even a greater number of operations have been performed upon a single individual. The most discordant opinions have prevailed in modern times, and even within a very recent period, as to the necessity of the operation for depressed fracture. To go no further back than Pott, who, it is well known, established it as the general rule of practice in every case of fracture with depression, the skull should be perforated and the depressed portion of the bone either raised to its level or entirely removed. Many of the best army and hospital surgeons in the early part of this century went so far as to believe that trephining was an absolute necessity to prevent consequent intracranial inflammation in cases of simple undepressed fracture of the skull; but since their time a great change of opinion has taken place on this subject, and it became the general rule not to interfere, even in cases of depression, unless symptoms of compression have supervened. Such was the practice up to a very recent period, and it might be asked: What have been the results? On this point, Dr. Laurie of Glasgow, a surgeon of ample experience, published some very trustworthy statistics in the *London and Edinburgh Medical Journal*, 1844, in which he took an opposite view to that established forty years before, namely, that in cases of depression, symptoms of compression should be our guide to the employment of the trephine. For he says that "Out of fifty-six cases operated upon in the Glasgow hospitals, including, in point of time, a period a little

short of fifty years, there does not appear in our records a single unequivocal instance of profound insensibility in which the mere operation of trephining removed the coma and paralysis, or in any way conduced to the recovery of the patient. We wish to be clearly understood as speaking of the trephine used in reference to the state of the bone in cases of profound insensibility, not employed to remove extravasated blood. Nor does the cause of our want of success appear at all obscure. We believe that in practice the cases of urgent compression dependent on depressed bone alone are very few indeed. We are well aware that many such are on record. We do not presume to impugn their accuracy. We merely affirm that the records of the Glasgow Infirmary do not add to the number. From what we have said, it will appear that we coincide with those who, in using the trephine in cases of compound fracture of the skull, look more to the state of the bone than to the general symptoms, and who employ it more as a preventive of inflammation and its consequences than as a cure for urgent symptoms, the immediate result of the accident." He goes on to state that "the details we have given are by no means in favor of the trephine. Of the fifty-six cases operated upon, eleven recovered and forty-five died. We feel assured that this affords too favorable a view of the actual results." The bold and active interference in cases of injury to the head, during the early part of this century, was followed in the last seventy-five years by a conservative treatment, which consisted principally in watching and waiting until the patient recovered or died; while along in the fifties and sixties the operation

was almost unknown, so great was the reaction against its general adoption. At St. Bartholomew's Hospital it was recorded by Callender in 1867 that the operation had not been performed for six years. Only in the most severe and often hopeless cases was the operation ever performed, and, as a consequence, the high rate of mortality, unjustly attributed to the operation itself, told still more against it. And it is only of a very recent date that the operation, and similar operative interference, has come into prominence, owing to the modern methods of operative surgery. Bryant's *Practice of Surgery* (p. 212) says that at Guy's Hospital, during a period of seven years, trephining and elevation of bone for head injuries have been performed in fifty-one cases, and of these only twelve recovered, thus making a mortality for the operation of 76 per cent. But this must not be considered a proper estimate, for the operation was performed upon cases severe and hopeless. Dr. Stimson has collected thirteen cases of operation for a single year at Bellevue Hospital (1880-81). Ruling out a gunshot fracture and a case where the fracture was not discovered until an abscess had formed in the brain, there remained eleven cases, with nine recoveries, or a mortality of 18 per cent. In seven of the cases collected by Dr. Stimson there were no brain symptoms beyond stunning, all of which recovered. In the two cases reported below, the operation in one was performed immediately, and in the other five days elapsed from the date of injury. Prompt recovery followed both.

CASE I. *Compound Depressed Fracture of the Vault of the Skull; Trephining; Recovery.*—J. M., male, age 12. Fell

from a tree, striking on his head. There was a lacerated and contused scalp wound, filled with dirt, three inches long, in right frontal and parietal regions. An extensive longitudinal fracture was found with the upper edge depressed. First seen five days after the injury, in consultation. The boy was then conscious, and could tell how he received his injury. The left arm and lower extremity were paralyzed.

Operation, Six Days after Injury.—Ether. Through a curved incision four and a half inches long trephining was performed. After removal of a button half inch in diameter in anterior portion of the fracture, the depressed bone was elevated to its level. Dura mater not injured. A perfectly sterilized catgut drain was used, and the scalp wound sutured with the same. The catgut drain was removed on the third day. There was no elevation of temperature. Primary union. The paralysis gradually cleared up, and at the end of six weeks' time recovery was complete, and now, thirteen months after the operation, is perfectly well.

CASE II. *Compound Depressed Fracture of Vault of Skull; Trephining; Recovery.*—J. P., male, age thirty-five. in the employ of the R. G. W. Railroad as bridge carpenter, fell from a trestle a distance of thirty feet, striking on the back of his head. Was brought to the hospital that same day, May 1st, delirious.

Physical examination.—There was a contused scalp wound about two inches square just above and a little to the right of the posterior occipital protuberance. He was put under ether four hours after the injury, and by a curved incision the scalp was turned down. There was found a comminuted depressed fracture about the size of a half-dollar above and to the right of the posterior occipital protuberance. A button of bone half an inch in diameter was removed and the opening enlarged with rongeur forceps to a little larger than a half-dollar. A horse-hair drain was used and the scalp wound closed with fine catgut. Horse hair drain removed on fourth day, and the wound healed by first intention. There was delirium and semi-coma for several days, which gradually disappeared, and recovery was complete at the end of six weeks' time. He is now—eleven months after the operation—perfectly well.

(b)—SUPPURATIVE DISEASE OF THE EAR.

It is estimated that there are not far from 2,000 deaths annually from ear disease in Great Britain, with a population of but little more than one-half that of the United States. Of all these a very large proportion are caused by cerebral disorder resulting from ear disease (Barker). Of 43,730 cases of ear disease tabulated by Bürkner, 66.9 per cent. were diseases of the middle ear, and 29 per cent. were suppurative middle ear disease. Four-fifths of these were chronic, among which are to be sought the greater number of brain lesions. It is generally thought that the excessive fetid discharges which often accompany ear diseases are far more dangerous than those without much odor; but Röhrer has shown that the non-fetid discharges are the causes of the most dangerous cerebral sequels, since fetor is due to bacilli which are not pathogenic, but merely saprophytic. Therefore, the presence or absence of odor in the discharge is no test of danger. Of all the discharges, the inspissated pus that is found in the ear in many cases is the most dangerous, being filled with pathogenic micro-organisms (American Text Book of Surgery).

CASE I. J. C. F. Aged 32, male. In October had an attack of la grippe followed by inflammation of the middle ear. On November 8, when he entered the hospital the membrum tympanum of left ear was perforated and a profuse discharge of pus flowing from the external auditory meatus. The pain over the mastoid process was severe and of a boring character. The mastoid region was swollen and œdematous. The hearing was nil. The external ear was swollen.

Operation, November 10th.—Ether. A curved incision was made over the mastoid process, beginning one-half inch

below the temporal ridge and one-half inch posteriorly to and parallel with the external auditory canal. The mastoid antrum was opened by chisel and hammer, when one-half drachm of pus was evacuated. Free communication was made between the antrum and the middle ear. Wound left open and packed with iodoform gauze. Was entirely free from pain after recovery from the anæsthetic. He made a speedy recovery.

CASE II. E. M., Female, age three and a half. Came to hospital November 21st, with a profuse discharge from the mastoid region. Her mother stated that two years previously the child had an attack of inflammation of the periostium of right mastoid process. Poultices were applied and a discharge soon ensued. A fistulas opening, however, remained and the discharge continued for the greater part of the two years prior to her admission.

Operation.—The usual curved incision was made over the mastoid process and a large superficial sequestrum was removed, together with a quantity of cholesteatomatus material from the mastoid cells, and necrosed material from the same region. The wound was packed with iodoform gauze and allowed to granulate. No elevation of temperature. The patient made a gradual but complete recovery, with no impairment of hearing.

CASE III. R. A., male, age 33. and of robust health. First complained of pain in left ear, February 11, which radiated over the corresponding side of head and face. Twelve days later he was admitted to the hospital. Temp. 100° F. The mastoid region was œdematous and there was deep tenderness over the same region. The external auditory canal was swollen. The tympanic membrane was bulging out and had lost its lustre. Hearing in the ear was nil. Paracentesis of the tympanic cavity was performed. The symptoms increased and a few days later Schwartz's operation was performed. A few drops of pus were found in the cells, together with considerable granulation material. The wound healed slowly and recovery was complete. The hearing was entirely restored.

CASE IV. Mrs. J. G., age 32. Came to the hospital May 25th for examination of left ear in which she complained of severe pain, radiating from the ear over the same side of the head, and of a boring character. On examination there was found all the symptoms of suppurative inflammation of the middle ear. She was treated in the usual way but the symptoms increased, and on May 31st, there was a free discharge of fetid pus from external ear. Pain was very severe and tenderness over the mastoid process developed simultaneously, to which was added on the next day swelling and œdema. Ear very prominent.

Operation, June 1st.—Ether. The usual incision and opening of the mastoid antrum by chisel and hammer. Free communication was made between the antrum and middle ear. Half teaspoonful of pus flowed from the antrum. The wound was not closed, but dressed and treated open, to insure free drainage. She was perfectly free from pain after recovering from the anæsthetic, and made a rapid recovery. Hearing completely restored.

CASE V. B. F. G.; age, 40; male. Had an attack of la grippe in the fall of 1891, followed by inflammation of the middle ear. All the usual means were resorted to to control the chronic suppuration from the ear, but without avail. When first examined, December 20th, 1891, the membrum tympanum was perforated and a small quantity of fetid pus was oozing out. He complained of intense pain in the mastoid region, especially at night, hearing markedly impaired and dizziness at times. The operation was postponed for some days because of refusal. The symptoms became so alarming that an operation was insisted on. An incision, beginning at the temporal ridge, was made over the mastoid region, posterior to and parallel with the auditory canal. Periostium markedly thickened over the antrum. With chisel and mallet the external table of skull was perforated, and, at a depth of three-quarters of an inch in the deeper cells, found a cavity containing two-thirds of a teaspoonful of pus. Wound was packed with iodoform gauze and allowed to granulate. Patient made a good recovery, with hearing about half the normal distance, and complete freedom from pain from the date of the operation. Was able to be about in five weeks.

CASE VI. Mrs. E. K.; age 37. Was first seen about February 12th. For about three weeks had been suffering from pain in left ear and mastoid region. Four days previous a fetid discharge of pus took place from the ear. Hearing markedly impaired. Schwartz's operation was performed February 13th. Pus was found in the mastoid antrum, with marked destructive changes in the cells. Free communication was established between the middle ear and the antrum. The wound was packed with gauze and left open. After recovery from the anæsthetic she expressed relief from the deep boring pain of the mastoid region. There was no elevation of temperature at any time following the operation. She went on to a complete recovery.

CASE VII. T. B. C.; male; age 32. Entered hospital April 19th. On January 9th was seized with a severe boring pain in the right mastoid process, which kept up for several days, and on January 25th there was a free discharge of pus from the ear. He was treated in the usual manner, but of no avail, and the symptoms became worse. He came to Salt Lake, and entered the hospital on the date above. On examination the mastoid region was œdematous, the ear was prominent and a profuse and fetid discharge flowing from the external auditory canal. Hearing nil. Schwartz's operation was performed and about a teaspoonful of pus flowed from the mastoid antrum. Free communication was made between the middle ear and the mastoid cells. The wound was packed with iodoform gauze. He went on to a good recovery. The hearing distance was about half the normal.

(B)—OPERATIONS ON THE FACE. (a)—NEOPLASMS.

There were sixteen cases of neoplasms, including face and neck, in all of which there was a careful microscopical examination after the operation. These are given in tabulated form. An analysis of the cases shows that of the six operations for epithelioma of the lip one was for recurrent, and five for primary disease. In the recurrent case the primary growth had been removed from the lower lip about eight

months ago. The recurrence took place in the sublingual and sub-maxillary glands, and also formed a characteristic epitheliomatous ulcer, about an inch in diameter on the lower lip. In the primary cases the duration of the growth had been, one year, eleven months, two and a half years, one and a half years and ten months respectively. Heredity was absent in every case and a source of irritation—*e. g.* pipe, was found in only one case. The age ranged from 46 to 70 years, the average being about 53. Enlarged glands were present in only one case.

In the ordinary cases the operation was by a V-shaped incision including the growth and a margin of healthy tissue, about a third of an inch in width. Where the disease was extensive the rectangular flap was used. The edges were brought into apposition by one or two silver wire sutures, supplemented with additional sutures of silk and cat-gut.

In the four operations for epithelioma of the tongue, in three cases was half the organ removed and in one the entire tongue. The lingual artery on the corresponding side was first found and ligated, and the tongue was drawn forward and partially removed with the knife and scissors. Hemorrhage was slight in all the cases, and recovery was prompt and satisfactory.

In the case where the entire tongue was removed, the method pursued was as follows: After finding and ligating both lingual arteries access to the organ was facilitated by dividing the lower lip and the symphysis of the jaw, the parts being wired together again after the completion of the operation. The organ was removed at its base by the knife. The

hemorrhage though not excessive was controlled by the paquelin. The wound was dusted over with iodoform and the patient regularly fed. The disease was extensive and the patient in a bad condition. Death ensued on the seventh day from septic-pneumonia. Heredity was absent in every case as well as a source of irritation—*c. g.*—a pipe or sharp tooth. The duration of the growth was, five years, two years, eight months and ten months respectively. Enlarged glands were present in only one case.

Subsequent History.—Sufficient time has not yet elapsed to enable one to determine how many permanent cures have been effected. The cases have all been followed, and ruling out one who died from the effects of the operation, they are all living and in no cases of epithelioma has the disease returned at the time of this writing, eleven to sixteen months since the first operation. Butlin's work on the operative surgery of malignant disease has the most complete statistics as to the subsequent history of epithelioma of the lip. It is chiefly derived from German sources. The three-year limit is the one generally adopted by surgeons as judging a cure due to the operation. Of 424 cases collected by him no fewer than 160 passed the three-year limit, so that the percentage of successes is a fraction over 38. As regard the percentage of cures due to operation, it is considerably less in epithelioma of the tongue. Applying the three-year limit to 170 cases collected by Barker, the percentage of successes is less than five. Of these 170 patients, seventeen were alive and free from disease at the end of one year, while at the end of three years the seventeen cases were reduced to

eight. On the other hand of 70 cases operated on by Butlin six were cases of cure on the three year limit, a percentage of just over 8.5. Barker did not take into account the number of cases lost sight of, for, had he done so, he would in all probability have found some cured, and the percentage of successes would have been improved. As to the removal of the glands in the cases here reported they were not removed except in one case where they were considerably enlarged. Some of the German surgeons, and more especially Bruns, advocate the removal in all cases whether enlarged or not. As to this latter move a sufficient number of cases have not been reported so as to give any satisfactory conclusions, but it is well to note that in all the successful cases reported as having passed the three-years' limit, there was an absence of glandular affection. In regard to the other cases, the fibro-myxo-sarcoma of the parotid deserves mention on account of its rarity. The tumor occurred in a man forty-three years old, was of slow growth and at the end of two years was about the size of a pigeon's egg. It was found encapsulated and was easily separated from the gland. Its growth was attended with little or no pain till the last few months. There was no facial paralysis. The microscope proved it to be a fibro-myxo-sarcoma. Several of the neighboring glands were found affected and removed. The growth returned in six months after removal, exhibiting a grave malignancy, but the patient was alive when last heard of. Butlin reports only twenty-nine cases in which the operation of re-

moval of a parotid sarcoma was performed, with two deaths.

Carcinoma of Thyroid Body. The growth had been in existence eight months, was about the size of the fist and confined to the right lobe. Irregular in outline, and the surface was tuberoso, on which soft spots were observed. The lymphatic glands were involved. The superior and inferior thyroid arteries were found and ligated. The right lobe and part of the isthmus were removed, as also enlarged lymphatic glands. The bleeding though free was easily controlled. The disease rapidly returned in two months, and he died six months after the operation. The cause of death was multiple; dyspnœa, collapse, and the presence of metastasis. At the autopsy the lungs, liver, kidneys and bones were found affected.

Sarcoma of the upper Jaw. The disease occurred in a girl 11 years old. She had had considerable pain in the right cheek prior to the appearance of a swelling over the antrum. This swelling gradually increased in all directions so that when she entered the hospital it had extended to the orbit, pushing the eye up, and below to the angle of the mouth, and back into the speno-maxillary fossa. The nostril on the affected side was almost completely obstructed, the color of the integument was natural but adherent to the tumor, which was rounded, lobed, and firm to the touch. Pressure and handling caused considerable pain. The tumor had been growing ten months. The usual operation by Fergusson's method, in which the incision was carried along the side of the nose and horizontally along the lower margin of the orbit. Tracheotomy was first performed and the ether administered by the inhaling portion only of Trendelenburg's apparatus, attached to the ordinary tracheotomy-tube.

In the second case of sarcoma of the upper jaw, the disease occurred in a man 38 years old. Tracheotomy was first performed and ether administered as in the preceding case. The operation consisted in the removal of the upper jaw with the exception of the orbital plate. Fergusson's method was carried out, but the horizontal incision was omitted. The alveolar process and palate were cut through, as in the pre-

AGE AND SEX.	DURATION OF SYMPTOMS, REGION.	SIZE OF GROWTH.	ENLARGED GLANDS.	HEREDITARY TENDENCY.	OPERATION.	TIME IN HOSP.	WOUND HEALING.	PATHOLOGIST'S REPORT.	REMARKS.
Case I. 46 years. Male.	1 year. Lower lip.	$\frac{3}{4}$ -inch diameter.	None.	None.	V-shaped incision. Silver and silk sutures. Ether.	10 days.	Primary union.	Epithelioma.	
Case II. 39 years. Male.	8 months. Tongue.	Right side tongue.	None.	None.	Ligature, right lingual artery. Right half of tongue removed. Hemorrhage not excessive. Ether.	29 days.	The wound healed rapidly.	Epithelioma.	
Case III. 56 years. Male.	2 years. Tongue.	Whole dorsum of tongue.	Enlarged glands.	None.	Ligature, both lingual arteries. Lower jaw divided and tongue drawn out and cut off at base.	7 days.		Epithelioma.	Died.
Case IV. 45 years. Male.	5 years. Tongue.	Right side tongue.	None.	None.	Ligature, right lingual artery. Right half of tongue removed. Hemorrhage slight.	25 days.	The wound healed rapidly.	Epithelioma.	
Case V. 47 years. Male.	1 year. Lower lip.	$\frac{1}{2}$ -inch.	None.	None.	V-shaped incision. Silk and wire sutures.	17 days.	Primary union.	Epithelioma.	

AGE AND SEX.	DURATION OF SYMPTOMS, REGION.	SIZE OF GROWTH.	ENLARGED GLANDS.	HEREDITARY TENDENCY.	OPERATION.	TIME IN HOSP.	WOUND HEALING.	PATHOLOGISTS' REPORT.	REMARKS.
Case VI. 60 years. Male.	2½ years. Lower lip.	Half lower lip.	None.	None.	Rectangular flap. Silver wire, silk and catgut sutures.	10 days.	Primary union.	Epithelioma.	/
Case VII. 70 years. Male.	1½ years. Lower lip.	Half lower lip.	None.	None.	Rectangular flap. Silver wire, silk and catgut sutures.	29 days.	Primary union.	Epithelioma.	
Case VIII. 50 years. Male.	10 months. Lower lip.	½ inch.	None.	None.	V-shaped incision. Silk and silver wire.	12 days.	Primary union.	Epithelioma.	
Case IX. 40 years. Female.	2 years. Neck.	Fist.	None.	None.	Excision.	5 days.	Primary union.	Lipoma.	
Case X. 45 years. Female.	1½ years. Neck.	Egg.	None.	None.	Excision.	4 days.	Primary union.	Lipoma.	
Case XI. 43 years. Male.	2 years. Parotid.	Pigeon's egg.	Enlarged glands.	None.	Found attached to parotid. Dissected out Encapsulated.	20 days.	Primary union.	Mixed tumor. (Fibro-epithelioma Sarcoma).	Returned in 6 mos. exhibiting a grave malignancy.

AGE AND SEX.	DURATION OF SYMPTOMS. REGION.	SIZE OF GROWTH.	ENLARGED GLANDS.	HEREDITARY TENDENCY.	OPERATION.	TIME IN HOSP.	WOUND HEALING.	PATHOLOGIST'S REPORT.	REMARKS.
Case XII. 37 years. Male.	7 years. Ears. Operated on 3 years ago.	Hazel nut.	None.	None.	Excision.	7 days	Primary union.	Recur- rent fibro- mata.	Returned in 3½ months.
Case XIII. 41 years. Male.	8 months. Thyroid.	Fist.	En- larged glands.	None.	Removed left lobe of thyroid.	6 mos.	Primary union.	Carcin- oma of thy- roid.	Returned in 2 mos. Died.
Case XIV. 4 years. Male.	10 months Tongue.	Left side of tongue.	None.	None.	Ligature, left lingual artery. Left half of tongue removed. Hemorrhage slight.	20 days.	Healed slowly.	Epithe- lioma.	
Case XV. 47 years. Male.	13 years. Lower lip.	Half lower lip.	En- larged glands.	None.	Rectangular flap. Ex- cised portion lower jaw. Second operation—six weeks later. Excision of submaxillary gland.	10 wks.	Healed slowly.	Epithe- lioma.	First operation 8 mos. prior. V-shaped piece. Recurrent.
Case XVI. 11 years. Female.	10 months. Superior max- illa.	Tangerine orange.	None.	None.	Tracheotomy. Com- plete removal of the upper jaw bone.	2 mos.	Healed slowly.	Epithe- lioma.	Returned in 3 mos. after leaving hospital.

ceding case. The molar process was sawn through from above downwards and from within outwards. A section of bone was made from the molar process through to the nostril just below the orbital plate. The bone was removed with lion-jawed forceps. The outer wound was closed and the cavity was treated as when the whole jaw is removed. This modified operation was used as the disease was found to affect the lower part of the bone only. He made a rapid and uneventful recovery.

(b.) DEFORMITIES.

CASE I. *Double Congenital Hare-Lip, complicated with Cleft Palate.*—M. B., male, age seven months. Operation, September 21st. A well marked protrusion of the intermaxillary bone added greatly to the difficulty in making a satisfactory closure of the cleft. The projecting portion of the bone was removed. The lip was sufficiently freed from its attachment to allow the flaps to be brought into apposition without too great tension. The edge of the cleft was freshened by curved incisions made from above downwards as far as the muco-cutaneous junction. Prolabial flaps were formed by cutting upwards and inwards at an angle of 60° to the preceding incision. The extremity of the philtrum was cut into a V-shape, and the raw margins were carefully implanted between the edges of the lateral flaps at the upper part. Silver wire sutures were used and other fine catgut sutures for accurately adjusting the edges. The sutures were removed on the seventh day. Primary union. The improvement was greatly marked.

CASE II. *Single Congenital Hare-Lip, Uncomplicated.* *Operation, October 10th.*—The incision was begun at apex of cleft cutting downwards in a curved direction, till the muco-cutaneous junction was reached and then the edge of the knife was turned so as to cut through the mucus membrane of the lip at an angle of 60° to the former incision. A corresponding incision was made on the opposite side. Silver wire suture were used instead of hare-lip pins, and intermediate fine catgut sutures. Good primary union.

CASE III. *Single Congenital Hare-Lip, Uncomplicated.* *Operation, April 9th.*—This case differed from the preceding in that the cleft was complete. Good primary union.

CASE IV. *Single Congenital Hare-Lip, Uncomplicated.*
Operation, April 9th.—This case differed very little from the preceding. Good primary union.

CASE V. *Single Congenital Hare-Lip, Uncomplicated.*
Operation, December 7th.—Boy aged five months. Here the operation consisted in removing the inner margin of the cleft, while on the outer side a flap was turned down by cutting from above downward commencing at the apex and extending to the middle and lower thirds, where it remains attached. It was then carried horizontally across the cleft and applied to the opposite margin, and the raw surfaces sutured together, using silver wire and fine catgut. Good primary union.

Plastic Operation for Burns and Injury of the Eyelids—Four cases.

Removal of Depressed Cicatrices of Face—Three cases.

(c) ENEUCLEATION OF EYE—NINE CASES.

All of which were the result of injuries received while blasting. In all cases the operation consisted in dividing the conjunctiva and sub-jacent fascia with scissors, in a circle as close as possible to the margin of the cornea. The tendons of the ocular muscles were then caught and divided and drawing the eye forwards and outwards the optic nerve was cut. The wound was packed and dressed with iodoform gauze.

(C) OPERATIONS ON THE NECK.

CASE I. *Stricture of Œsophagus, external Œsophagotomy, Recovery.*—E. R., female, age 20. When eight years old swallowed some concentrated lye. For twelve years has had a stricture of œsophagus, with inability to swallow anything but liquid food. For many years the stricture was not tight enough to be a complete barrier, hence did not present herself so that the dilatation treatment could be carried on earlier. In the last year it has become such as to allow a moderate quantity of milk to pass through, but is utterly impassable to even the smallest whalebone bougié. Entered

hospital June 23. On examination it was found that we had to deal with a very tight stricture of the œsophagus, the treatment of which by small pointed bougiés is often not only a matter of extreme difficulty but fraught with great danger of rupture through the soft and dilated wall of the tube above the sight of trouble. As the stricture happened to be in the upper part of the œsophagus it was determined to open the gullet in the neck and split the dense cicatricial tissue. She was becoming rapidly emaciated.

Operation, June 25th, Ether.—An incision three inches long was made on the left side of the neck at the inner margin of the sterno-mastoid, the muscles and deep fascia, pulled well towards the outer side, exposed the sheath of the great vessels. The dissection was carried carefully between these and the trachea, avoiding the thyroid artery and vein, the thyroid gland, and the inferior laryngeal nerve, until the œsophagus and lower part of the pharynx were exposed. A sound was passed through the mouth and made to project into the wound. The œsophagus was then opened about three quarters of an inch above the seat of stricture. A small probe was successfully passed through the stricture and dilated sufficient to introduce an Otis' urethrotome. The stricture was cut at its maximum and bougiés were passed with remarkable ease the entire length of the œsophagus. The bleeding was insignificant. The patient experienced little or no shock from the operation and subsequently had no fever. The wound was left open and a rubber drainage tube placed in the superficial wound. The neck was kept fixed and rigid. She was fed by a tube on the second day passed by the mouth. On the seventh day the wound in the gullet had closed, and feeding by the tube was discontinued on the ninth day. She left the hospital July 6th. The bougiés were passed by the mouth twice a week for several months, and at time of writing, eight months after the operation, she eats everything and has no difficulty in swallowing. She has gained in flesh and weighs 130 pounds.

CASE II. *Foreign Body Lodged in Œsophagus, External Œsophagotomy*—Two cases; two recoveries.

(1) Thomas B., age 69. A piece of chicken bone was lodged in the upper part of the gullet and after failure to re-

move by the usual method, external œsophagotomy was resorted to. The operation and after treatment were the same as described in the preceding case. The piece of bone was removed through the incision. His recovery was rapid and uninterrupted. Twenty days after he left the hospital.

(2) F. C., male, age 31. Was admitted with a piece of chicken bone lodged in the œsophagus. It was found impossible to remove it by the usual method and external œsophagotomy was performed. He left the hospital in eighteen days. The operation and after treatment were the same as described in the two preceding cases.

CASE III. *Abscess of the Thyroid Body*.—P. R., male, age 36. Was first taken with rigor and high fever which continued for several days. Two days later there was a diffuse enlargement in the neck attended with intense pain. He entered the hospital ten days after the onset of the attack.

Examination.—There was a swelling in the right side of the neck about the size of the fist. The tissues of the neck were red and œdematous. The superficial veins were distended, and the trachea and œsophagus compressed against the spine. There was dysphagia. The swelling moved up and down with the swallowing. A slight cough was present and his voice was stirdulent. Pressure elicited great pain and a peculiar noise in the throat. Fluctuation was plainly present. Temp., 101° F; pulse, 100; resp., 30. A diagnosis of abscess of thyroid body was made.

Operation; Ether.—An aspirating needle was introduced and a syringe full of pus withdrawn. An incision one and one-half inches in length was made over the most prominent portion and the superficial structures divided layer by layer, till the tissues of the thyroid were recognized.

An incision was made into the swelling from which pus flowed freely. The opening was enlarged and a rubber tube inserted. The discharge of pus was quite free for several days. His recovery was slow.

Two operations for Lipomata of the Neck.

Tubercular Lymphadenomata of Neck.—Ten Operations.

(D) MISCELLANEOUS.

Empyema of the Antrum.—One case.

The symptoms consisted of œdema of the overlying soft parts, and a purulent discharge from the nose when the patient lay down and turned on the sound side. The antrum was drained by pulling the canine tooth on the affected side and a small gouge pushed up through the alveolus. Recovery was complete.

Six operations for extensive Necrosis of the Lower Jaw.

Twenty miscellaneous cases of too little importance to be given in detail.

OPERATIONS ON THE THORAX.

(a) Tumors of the breast; an analysis of six cases. The accompanying table contains a brief history of each case. The most important points may be summarized as follows:

Classification.—A careful microscopical examination was made in each case. Of the six cases three were carcinomata and three adenomata.

Age.—In the cases of carcinomata the ages were 45, 62 and 44, respectively, of which two had born children. In one case the patient was a man aged 44, whose mother and sister had died of cancer of the breast. The tumor was situated in the left breast and was the size of the fist, and had been growing fourteen months, attended with great pain. The axillary glands were invaded. He received an injury about four months prior to his first noticing the growth. The breast and axillary glands were excised. The growth was shown by the microscope to be scirrhus. The glands were invaded by the carcinomatous infiltration. In the other two cases of cancer no history of trauma could be obtained, nor was it possible to attribute the neoplasms to heredity. The same holds true of the cases of adenomata. The patients with adenomata were 40, 20 and 28 years old respectively, only one of whom had born children.

In only two of the cases were the axillary glands invaded, and the microscope showed the enlargement.

to be due to carcinomatous infiltration. In the two cases the enlarged glands were detected prior to the operations. The axilla was free from disease in all the other cases.

Diagnosis.—In the majority of the cases the diagnosis was reasonably sure from the clinical history and the physical examination, but in all the cases the diagnosis was subsequently confirmed by the microscopical examination. In the doubtful cases an exploratory incision was made through the tumor itself and the nature and extent of the operation was determined by such exploration.

Plan of Operation —(1) Removal of the tumor alone. This was done in the cases of adenomata.

(2) Removal of the breast and axillary glands. This was done in the carcinomatous cases, where the breast and axillary contents with the tissues between them were removed.

(3) Removal of the breast including the tumor. This was done in one case of carcinoma of the breast where the axillary contents were not found to be invaded. Rubber drainage tubes were used where the operation had been extensive. After the removal of the tumor in the cases of adenomata no drainage was used, in all of which the wound healed by primary union. The dressing employed consisted of gauze of

(a.) TUMORS OF BREAST.

AGE.	DURATION OF SYMPTOMS.	POSITION AND SIZE.	HEREDIT.ITY.	HIS-TORY OF INJURY.	OPERATION.	AXILLA INVAD.	DAYS IN HOSPI-TAL.	DRAINAGE.	WOUND HEALING.	PATHOLOG-ICAL.
1-45 yrs. Married. Female.	1 yr-- Pain.	Rt breast, egg.	None	None.	Ether. Excision of breast.	No.	21 d.	Rubber.	Primary union.	Carci- noma.
2-40 yrs. Single. Female.	6 mos-- No pain.	Tumor in each breast size of orange.	None.	None.	Ether. Excision of tumors only.	No.	18 d.	Rubber.	Primary union.	Cystic- Adeno- fibroma.
3-62 yrs. Married. Female.	1½ yrs-- Pain.	Left breast, size of orange.	None.	None.	Ether. Excision of breast and axillary gl'ds.	Yes.	25 d.	Rubber.	Delayed union.	Carci- noma.
4-44 yrs. Male.	14 mos-- (great pain.	Left breast, size of fist.	Mother & sister died of cancer of brst.	Yes.	Excision of brst. and axillary glands. Ether.	Yes.	27 d.	Delayed union.	Rubber.	Carci- noma.
5-20 yrs. Single. Female.	1 yr-- No pain.	Rt breast, size of egg.	No.	No.	Excision of tu- mor only. Ether.	No.	12 d	No drainage.	Primary union.	Adeno- fibroma.
6-28 yrs. Married. Female.	8 mos-- Pain.	Left breast, egg.	No.	No.	Excision of tu- mor only. Ether.	No.	11 d.	No drainage.	Primary union.	Cystic- Adenoma.

bi-chloride of mercury 1 to 2,000 and firm pressure was secured by a binder applied externally. The drainage tubes were taken out at the end of 48 hours. The average time spent in the hospital was 19 days.

The operation consisted in an elliptical incision including breast and tumor, the long axis of the incision being in the direction of the fibers of the pectoral muscles. In the two cases where the axilla was explored the incision was prolonged and the enlarged glands removed.

Butlin gives an analysis of 411 cases, showing a mortality of nine per cent. in 141 cases where the breast alone was removed, and a mortality 23 per cent. in 170 cases where the breast and axillary contents were removed.

(b) MISCELLANEOUS CASES.

CASE I. *Empyema; Estlander's Operation.*—Recovery. Thomas, J. T., age 30, a miner. His early life was spent on a farm and at 18 began mining; no history of tuberculosis in family; always of sound health up to nine years ago when he received an injury while working in the Ontario mine, fracturing two ribs of right side. Six months after the injury he had an attack of pneumonia(?) on the injured side, and the right pleural cavity became filled with fluid. Six months later about one quart of pus was aspirated. The aspiration was repeated many times in the next six months, removing at each time a considerable quantity of pus. In 1888, six years later, a piece of the sixth rib was taken out. He first came to the hospital in 1889, and on the 29th day of March of that year the fifth, sixth, seventh, eighth and ninth ribs from the costal cartilage to their angles were removed. In September of the following year the end of the ribs were removed for necrosis. In May, 1891, the sternum was curetted for diseased bone. In June, 1892, the wound had so far healed and the cavity collapsed that the integument was brought together.



He has entirely recovered from the operation, has no cough, expectoration or night sweats. He is five feet five inches in height and weighs 145 pounds. Previous to the operation in



1889, he weighed less than 100 pounds. One noticeable feature is the extreme clubbed condition of the terminal phalanges of the fingers and toes which were perfectly normal prior to the injury to the side.



CASE II. *Estlander's Operation for Chronic Empyema.*
—Recovery.

J. B., age 27, of a tuberculous history on mother's side. In November, 1890, while working on the Bear River Canal, Utah, was suddenly taken with acute pleuritis of left side following a wetting. The sero-fibrinous exudate persisted for many months, re-accumulating after aspiration and resisting all treatment. He was admitted to the hospital February 20th, 1892. Greatly emaciated, slight cough, dyspnoea and marked pain in the chest. Symptoms of septic-infection not wanting. Intercostal spaces bulging. Oedema of the chest walls. There were all the physical signs of purulent pleurisy, the fluid reaching to the clavicle.

Estlander's operation February 27th. Removal of the fifth, sixth, seventh and eighth ribs, of the affected side, from the costal cartilages to their angles. The operation ended in recovery with complete obliteration of cavity. He steadily gained in flesh and strength, and when last heard from, twelve months after the operation, was living in Boston and in good health.

CASE III. *Extensive necrosis of Ribs.* Re-section of part of eighth and ninth ribs. Recovery.

Necrosis of Ribs, following typhoid fever; two cases.

Necrosis of Sternum, following typhoid fever; three cases.

OPERATIONS ON THE ANUS AND RECTUM.

(a.) *Fistula in Ano*; ten cases. Tubercular origin, in all probability, in six cases.

Treatment. Free incision, scraping and packing the wound with iodoform gauze. The bowels were kept confined for four or five days, an enemata having been given previous to the incision. At the end of five or six days a mild saline cathartic was given. Incision occasionally stimulated with silver nitrate.

(b.) *Internal Hemorrhoids*; twenty-six.

In sixteen cases the method of treatment employed was partial excision and ligation. The results were good.

In six cases Whitehead's method was employed, and in only the cases where primary union was obtained were the results satisfactory. Where primary union failed there was more or less stricture.

In four cases the cautery was used with good results.

(c.) *Carcinoma of the Rectum*; four cases; with four operations and one death.

In one case the disease returned inside of six months. In the remaining three cases there was a substantial amelioration of their condition. In all the four cases the method employed was that of rectal excision. In the fatal case the severe and high operation was performed. In all the cases operated upon there was a fair prospect of a complete removal of the disease.

In addition to the above there were five other cases upon which proctectomy was not deemed justifiable, the tissues involved being too extensive. In these cases the disease had extended through the muscular coats and had apparently invaded the bladder, and prostate or uterus in front, and was adherent to the sacrum behind. In these cases colostomy was advised, but rejected.

The diseased part was generally about two inches above the anus, and here the bowel was strictured. The surface was nodular, hard to the touch, and easily broken with the finger nail. Of the nine cases there was only one form of the disease—adenoid carcinoma. In some of the cases the growth was present for only a few months, and it was in the youngest patient (26) that the growth returned after excision. In this later case there was a history of heredity. The ages in the cases operated upon were: 26, female; 40, female; 38, male; 41, female (fatal); non-operative—41, male; 56, female; 49, female; 39, male; 44, female. The average time in the hospital was thirty days.

(d.) *Stricture of Rectum*; two cases.

(e.) *Ischio-rectal Abscesses*; two cases.

(f.) *Ulcer of Rectum*; two cases.

OPERATIONS ON THE GENITO-URINARY ORGANS.

(A.) *Male.*—(a.) *Hydrocele*; twelve cases; twelve recoveries.

Operation. Von Bergmann's modification of Volmann's. Recovery was rapid in all cases; no complications.

(b.) *Urethrotomy for Stricture of the Urethra*; ten cases; internal, three; external and internal, seven, four of which were without a guide. The internal method was used in those cases where the stricture was situated in the pendulous portion of the urethra. Where the stricture was behind the bulbo-membranous junction, and of a resilient character, external perineal urethrotomy was performed and a rubber tube was left in the bladder from thirty-six to seventy-two hours. The urethra was enlarged so as to easily allow the passage of a No. 30 steel sound (F). The bladder was washed out with warm boric acid solution at the close of the operation.

After treatment. After the third or fourth day, the sounds were passed every third day till the patient left the hospital, and was further advised to continue the passing of the sound.

(c.) *Varicocele*; four cases; four recoveries. The method employed was sub-cutaneous ligation in all cases, and the results were satisfactory.

(d.) *Congenital Phimosis*; ten cases; ten recoveries. Ether was given in most cases, but chloro-

form and cocaine were also used. Circumcision was performed in all cases by the clamp method.

(f.) *Miscellaneous*, 13; recoveries, 13.

1. Suprapubic Lithotomy; two cases.
2. Lateral Lithotomy; one case.
3. Litholapaxy; two cases.
4. Extravasation of urine; one case.
5. Epithelioma of the penis and inguinal glands; amputation of penis; one case.
6. Tuberculosis of the testis; castration; one case.
7. Hydrocele and cystic degeneration of the testis; castration; one case.
8. Hæmatocele with hydrocele; one case.
9. Multilocular hydrocele; one case.
10. Chronic cystitis; cystotomy; one case.
11. Rupture of urethra.

CASE I. *Vesical Calculus; Suprapubic Lithotomy; Recovery*.—E. R., age 21; admitted June 15th. Had symptoms of irritation of the bladder for thirteen years. Examination with a Thompson searcher easily detected a stone which was apparently about two inches in diameter.

Operation.—The urine was drawn off and the bladder filled with twelve ounces of warm water. A Colpeurynter was used to distend the rectum. A vertical incision was made above the pubis, and the stone was quickly found, but extracted with considerable difficulty. A rubber tube was placed in the bladder, the wound healed by granulation, and at the end of seven weeks all urine was passed by the urethra. The calculus was found to consist of calcium oxalate and earthy phosphates. It was three and a half inches in its long diameter and two inches in its short.



CASE II. *Vesical Calculus; Litholapaxy.*—Charles A. C.; age 27. For five years has had symptoms of irritation of the bladder. Examination with Thompson's searcher easily detected a calculus, which was about an inch in diameter. Litholapaxy was successfully performed.

CASE III. *Vesical Calculus; Litholapaxy.*—B. A. C., age 56, for twelve years has had symptoms of bladder irritation. Examination with Thompson's searcher easily detected a small stone about one and one-half inch in diameter. Litholapaxy was successfully performed.

CASE IV. *Lateral Lithotomy for Removal of Spruce Gum from the Bladder.*—The staff was passed and feels the foreign body. The usual incision for lateral lithotomy was made and two pieces of spruce gum each about an inch long were removed. On the introduction of the staff there was considerable pain and blood passed in considerable quantities. When he entered the hospital the urine was filled with pus, fetid and poisonous, and a septic fever was raging. The case is important as showing the importance of infection in the production of vesical symptoms. In this case there was set up a high grade of cystitis by the presence of a piece of soft spruce gum introduced by the man himself only a few days before.

CASE V. *Vesical Calculus, Suprapubic Lithotomy; Death.*—Charles B., age 62, had suffered twelve years with stone in the bladder. On examination there was found a considerable degree of cystitis. The stone was of large size, and it was decided to perform suprapubic lithotomy. The patient presented all the evidences of advanced senile degeneration and he was well nigh exhausted by the pain and frequent micturition from which he had suffered. The stone was removed by the high operation. The patient bore the anæsthetic badly and on the second day became delirious and died from uræmia. At the autopsy atheroma of the vessels was very noticeable, and the kidneys were the subjects of advanced pyo-nephrosis.



CASE VI. *Epithelioma of Penis and Inguinal Glands; Amputation of Penis; Recovery.*—A. B. S., age 47, was admitted September 20th. His general health had always been good and he had never had any venereal disease. Three years before a small wart-like growth appeared on the glans penis near the corona.

This had continued to grow till the time of the operation, when it was about the size of a tangerine orange. The surface was entirely ulcerated over and the discharge profuse, aided by frequent cauterizations. The edges were indurated and the glands in both inguinal regions were enlarged.

Operation, September 22nd.—The penis was amputated three-quarters of an inch from the symphysis pubis and the inguinal glands carefully dissected out. A catheter was allowed to remain in the bladder the first 48 hours, after which time micturition was voluntary and without pain. Both the penis and inguinal glands were found to be epitheliomatous.

CASE VII. *Traumatic Encysted Hydrocele of the Testis; Castration.*—H. J. M., age 30, while in the employment of the R. G. W. Railroad as brakeman, on November 28, 1888, was caught between the drawheads fracturing both thighs in the upper one-third. The testicles were also injured. The fracture of both thighs was treated in this hospital with a good result, viz:

1. Firm bony union.
2. No angular deformity.
3. Both lower extremities of same length.
4. No undue deviation of feet.
5. No lameness.
6. Functions perfectly restored.

Was again admitted to the hospital January 18, 1892, on account of hydrocele. His father died at the age of 50 of tuberculosis pulmonalis.

Present Ailment.—In June, 1890, he first noticed the inguinal glands swollen and very tender and a dull pain in the groin, the right testicle was swollen and painful. No gonorrheal history. The symptoms subsided with the exception of the testicle which remained tender and swollen. In the spring of 1891 he first noticed a lump appearing on the right testicle

which gradually enlarged and spread about the testis to such an extent that he could no longer feel the organ. When he entered the hospital, January 18, 1892, there was a large hydrocele of the right side.

Operation.—Von Bergmann's modification of Volkmann's operation was performed and the cyst was found to be connected with the testicle. The fluid was of a milky white color containing spermatozoa, dead, and motionless. The tunic was found to be about an eighth of an inch in thickness. There was caseous degeneration of the testis almost breaking into an abscess at the point where he first noticed the lump two years previously. The tunic was removed and the caseous matter was scraped out. The scrotum was sutured and drained at the most pendent portion. The wound entirely healed and the patient allowed to go about.

February 8th, the skin broke down rapidly forming an abscess. February 10th, operation; castration.

The testicle was three times its normal size and the skin adherent. The right testis was removed. Speedy recovery followed. The testis was found to be the seat of a well advanced tuberculosis.

CASE VIII. *Hydrocele and cystic degeneration of the Testicle; Castration.*—C. C. H.; age 23. Received an injury to the right testicle one year previous.

Examination.—The scrotum was found pear-shaped, of slow growth and translucent. The testicle had been the seat of severe pain, all of which had subsided.

Operation.—Von Bergmann's modification of Volkmann's. The sac contained about one pint of straw-colored fluid. Secondary cysts were found in the testicle. Castration. Speedy recovery. The testicle was found to be of a cystic degeneration.

CASE IX. *Hæmatocele with Hydrocele.*—F. J. B.; aged 22. While boxing was hit severely on the scrotum. There was a pre-existing hydrocele. The tumor was swollen to an immense size, and came on rapidly after the injury. The scrotum was black and violet-colored, tense, painful, with a more or less evident feeling of fluctuation. On account of the inflammation imminent from the tension and the blood

in clots, an incision was made, the clots turned out and the cavity thoroughly washed. The bleeding points secured by ligature. The damaged and redundant portions of the tunica vaginalis cut away. The cavity was drained. The testis was apparently not injured, and the reaction following the operation was rapid and severe, but only part of the scrotum sloughed. He left the hospital in five weeks' time.

CASE X. *Multilocular Hydrocele*.—R. W. L.; age 3. Was injured in the right testicle by a fall when two years old. Was admitted to the hospital November 25th. The scrotum was pyriform and about the size of a tangerine orange, and translucent. Absence of pain.

Operation.—Incision and removal of tunica vaginalis. The tumor consisted of a main sac filled with a pale yellow fluid, at the bottom of which were several small cysts, the largest about the size of a cherry, containing a clear, white fluid. The usual mode of dressing and a speedy recovery followed.

CASE XI. *Extensive infiltration of Urine; Perineal section; Recovery*.—F. W.; age 48. Was brought to the hospital suffering from an extravasation of urine caused by stricture of the membranous portion of urethra. The infiltration was extensive, distending the perineum, the scrotum and the connective sub-cutaneous tissue of the penis, and also perforated the deeper layer of the superficial perineal fæcia and descended upon the thigh. The infiltrated parts were œdematous and emphysematous, marked here and there with dark spots, and in some places sloughs. The constitutional symptoms were those of shock, a cold and clammy skin; feeble, quick and irregular pulse, hurried respiration, and a furred tongue.

Operation. Incisions were made over the dusky area through into the sodden cellular tissue. The patient was placed in the lithotomy position, and a free incision was made deep in the middle line of the perineum till the main source was tapped. The bladder was thoroughly drained; this was found to be in a state of advanced cystitis. The bladder was washed out with a warm boric acid solution. The stricture was divided externally and internally. The patient recovered slowly.

CASE XII. *Cystotomy for Chronic Cystitis.* L. W.; age 55. Had suffered for several years with a chronic cystitis. The calls to urinate were frequent and imperative by night and day, with no feeling of relief. Pain of a heavy, burning character in the perineum, above the pubis and in the loins and back. The urine contains pus, voided as a stringy mucus, and blood; alkaline in reaction. Amorphous phosphates deposited in excess. The expulsive power of the bladder is lost, the viscus fills up and trickles passively away. As soon as a catheter is introduced, the urine does not come in a spurt, but drops down nearly perpendicular from the end of the instrument (atony).

Operation.—The bladder was drained by making a median incision in the perineum, and a soft rubber tube of large size introduced into the bladder and the latter irrigated with medicated solutions. The operation, while not resulting in a complete cure yet produced a marked palliation of the symptoms.

CASE XIII. *Rupture of Urethra; Extravasation of urine; External Perineal Urethrotomy; Recovery.*—O. C.; age 19. In attempting to mount his bicycle he fell astride the rear wheel, rupturing the urethra. The patient was brought to the hospital on the following day, the scrotum enormously swollen. Urination impossible. Slight hemorrhage from the meatus. Impossible to introduce even a filiform bougié.

External perineal urethrotomy was immediately performed. The urethra was found to be completely severed at the bulbo-membranous junction. The proximal end of the urethra was easily found, and a tube was introduced into the bladder and allowed to remain several days. In due time the wound healed and full-sized sounds were introduced at regular intervals.

(B.) *Female.*—(a.) *Lacerated Cervix Uteri;* six cases. Emmet's operation was employed, silver wire sutures being used. Sutures were removed on the eleventh day, and results were all satisfactory.

(b.) *Lacerated Perineum;* five cases. Flap splitting operation. Silver wire sutures. Sutures removed on the fourteenth day; union good.

CASE I. *Hydatidiform Degeneration of the Chorion*.—Mrs. McGr., age 42. Has had several miscarriages, but no children. There is a history of syphilis. She sought medical advice on account of profuse watery and sanguinous discharge recurring with great frequency. The first discharge occurred about one month previously, attended by severe pain in the abdomen, incessant vomiting, and dyspnœa, which have reduced her to an extreme. She was in her third month of pregnancy.

Examination.—The uterine tumor had been rapidly increasing and was found to reach up to the umbilicus. The sanguinous discharge was profuse and portions of cysts, sometimes in large masses, were found mingled in the discharge. As soon as the diagnosis of cystic degeneration of the chorion was established, under chloroform, the os being widely dilated, the uterus was cleared of the cystic mass varying in size from millet seeds to grapes or even larger. The hemorrhage after the operation was severe but was easily controlled by packing with iodoform gauze.

CASE II. *Uterine (Placental) Polypus*.—Mrs. K. C., age 36, four months prior to her admission to the hospital had a miscarriage at about two months. She had been subject to hemorrhage, which at times was very profuse and offensive, and had labor pains now and then, which were usually very painful and attended with profuse hemorrhage.

Examination.—She was anæmic. The uterus was sensitive on pressure. The os was dilated and a polypus about the size of a hen's egg was found in the cervix, whose pedicle could be followed as far as the uterine wall. On pressing the fundus blood escaped from the external os. The tumor was drawn down with forceps, detached from the uterine wall by twisting and the base scraped with a sharp spoon. The uterus washed out with a three per cent. carbolic solution and ergot given for several days.

UPPER EXTREMITIES.

Fractures and Dislocations; twelve cases.

CASE I. *Amputation at the shoulder joint for crush of the arm; Recovery.*—F. N.; age 28; brakeman in the employ of the R.G.W. railroad. While setting brakes fell between the cars, and two cars passed over his right arm. Was taken to the hospital November 21st, and at midnight the arm was amputated at the shoulder joint. The humerus was crushed and the muscles of the arm were lacerated and contused to the shoulder joint and filled with dirt. Hemorrhage was profuse, and when he reached the hospital was almost in a state of collapse.

Operation, November 21st, at midnight.—After compresses were put about the arm, a circular incision was made two inches below the head of the humerus and all bleeding points secured. A second incision was made from the acromion process, perpendicular to the circular incision, and the head of the humerus was removed. Two rubber drainage tubes were used, which were taken out on the third day. He made a good recovery.

CASE II. *Amputation of lower one-third of arm for gunshot wound at elbow.*—C. J., male; age 21. Was accidentally shot through left elbow, December 10th, 1891; calibre 45. He was first seen six weeks after the accident, when the entire forearm was swollen and œdematous. The gunshot wound was suppurating freely, and several fragments of bone were removed. All the symptoms of septic infection were present. Amputation was advised and assented to.

Operation.—Ether. Amputation at middle of arm. A rubber drainage tube was used and taken out on the second day. Primary union followed.

CASE III. *Wiring of un-united fracture of Humerus with secondary suture of Musculo-Spiral Nerve; Partial success; union of fracture.*—A. B. D.; male; age 35; carpenter by

trade. Was admitted February 12th, 1891. The patient, a strong, well developed man, while at work was injured by a falling derrick. The injury received was a fracture of the humerus in its middle portion and fracture of the ulna of the same arm. The injury was received three months prior to his admittance. On examination the ulna was found united, while the fracture of the humerus remained ununited. There was also complete paralysis of the extensor muscles of the forearm with marked atrophy and symptoms of a divided nerve.

Operation.—Ether. An incision three inches long was made over the site of fracture on the posterior and outer aspect of the arm. The ends of the bones were made even, and, after three-quarters of an inch had been removed, they were brought into apposition and held in place by means of a strong silver-wire suture. The musculo-spiral nerve was found divided and the ends separated half an inch. The upper end with its bulbous extremity was quite prominent; the lower end was closely adherent to the surrounding callus and much atrophied. A section of the upper end was carried through the upper part of the bulb close to the normal trunk; of the lower end only a small portion was cut off. The ends were brought together and a small needle armed with a catgut suture was passed completely through the nerve trunk at right angles to its long axis, about a quarter of an inch from the cut surface in each end, and a second suture was passed at right angles to the first. These sutures were drawn tight until the opposing cut surfaces were brought into contact. A small capillary drain was left in the wound, and the arm was placed in a splint in such a position as to keep the injured nerve in a state of the least possible tension. The dressings were not removed for four weeks, there being no indication to the contrary. The wound healed by first intention. Six weeks after the operation there was no return of sensation or motion.

Seven months after the operation the hand is much improved and there is firm bony union. The muscles which were paralyzed and atrophied have greatly increased in bulk, but he has no power over them. No reaction to galvanism or faradism.

November 12th, 1891.—A slight abscess formed and the silver wires were removed. Galvanism and faradism have been used twice a week. The hand is still improving.

February 12th, 1892, one year after operation.—The reaction to galvanism and faradism still more improved, while sensation has almost returned.

June 21st, 1892.—Left the hospital, sensation having entirely returned. The muscles have still further increased in bulk and he has good power over them. The patient was seen several months later and he was still further improved, but was not yet able to work well as a carpenter.

CASE IV. *Amputation at both Wrists.*—M. P., an Italian laborer, while attempting to thaw out some giant powder had both hands blown off and face badly burned. Was brought to the hospital February 1st. Amputation at both wrists was performed the same day. He made a good recovery.

CASE V. *Amputation of both Hands at lower one-third Forearm.*—A. F. E.; male; age 52; miner. In a premature explosion in the Mercur mine, both hands were torn off at the wrists and both eyes destroyed. Was brought to the hospital May 8th.

Operation—Amputation of both forearms in the lower one-third, and enucleation of both eyes. He was in great shock, but rallied and improved. Three weeks later he was taken to his home.

CASE VI. *Compound Comminuted Gunshot Fracture of Humerus; Re-section and wiring; Successful.*

Mrs. C., wife of a physician, on the night of May 17th, was shot in the lower one-third of left arm by a burglar; calibre 38. On the following morning she was removed to the hospital and under ether an examination was made. Several large pieces of bone were removed. The lower fragment was found *not* to be fractured into the elbow joint and it was decided to resect the bone.

Operation.—An incision three inches long was made on the outer side of the arm, and several more pieces of bone were removed. The lower fragment was intact three inches above the elbow joint. The ends of the bones were made even and after three and one-half inches of bone had been removed

they were brought into apposition and held in place by means of stout silver wire sutures. A small drainage tube was left in the wound.

Subsequent Treatment and Progress.—The arm was dressed in a heavy antiseptic dressing and placed in a suitable firm splint. At the end of the second day was dressed on account of a bloody discharge, at which time the tube was removed. The next dressing was on the eighth day. From now on there was no elevation of temperature and she went on to a rapid and uneventful recovery. Eleven months after the operation she had good use of her arm and was able to attend to her household affairs.

CASE VII. *Arthrotomy of Elbow Joint.*—W. K., age 10, entered the hospital October 5th with a very pronounced deformity due to injury of elbow joint sustained six months prior to his admission. The injury was received by a fall from a hay stack, striking upon his right elbow. He was treated for dislocation of the radius and ulna backwards. It was put in a splint at less than a right angle and left for six weeks. Flexion of the arm was painful, on which account the arm was kept in an extended position at about an angle of 180° . Flexion could be carried to about 110° . The fore-arm was displaced outward and backward. Arthrotomy performed October 7th revealed fracture of internal condyle and coronoid process. The coronoid process being loose was removed and half of the internal condyle, enough to permit flexion of the fore-arm. The wound healed by primary union and at the end of five weeks passive motion was begun and continued for some time. A rubber drainage tube was left in the wound and the arm put up in the extended position with a heavy antiseptic dressing and a splint externally. He left the hospital on December 7th with a very useful joint.

CASE VIII. *Congenital Dislocation of the Radius Backward.*—A. A., Female, age 18. Admitted July 7th. The radius projected backward two inches. Incision and removal of projecting portion of radius. Primary union.

CASE IX. *Arthrotomy of Elbow Joint.*—P. J., Male, age 19, fell down an embankment a distance of twenty feet, striking on the point of right elbow, sustaining a comminuted

fracture of lower extremity of humerus. Admitted to the hospital May 12th. It was impossible to put the arm up in a flexed position on account of a tendency to a backward displacement of the ulna. It was therefore treated in the extended position. On removing the splints two months later it was found that there was considerable anterior displacement of the trochlear surface due to the interposition of callus between the fragments so that it was impossible to flex the arm. Arthrotomy was performed July 20th, when enough of the anterior trochlear surface was removed to permit flexion of the fore-arm. The wound healed by first intention, and passive motion began in four weeks time, resulting in a useful joint.

CASE X. *Removal of Carpal Bones for Necrosis, Following Gunshot Wound of the Wrist.*—A. W. W., male, age 30, was shot through the right wrist February 20th, the ball passing from within outwards. When seen on February 29th extensive necrosis of carpal bones had ensued. A single free incision was made over the dorsum of the wrist, extending along the center of the meta-carpal bone of the index finger (Langenbeck's). Through this opening the carpal bones were readily turned out. The bases of the meta-carpal bones, and the lower extremities of the radius and ulna were not excised. The wound healed slowly and passive movements of the fingers were performed at an early period after the operation. He was discharged from the hospital with a good result.

CASE XI. *Operation for Deformity just above the elbow joint.*—N. W.; female; age 12. Fell from a chair sustaining a supra-condyloid fracture of left humerus. When she entered the hospital ten months after the accident she was unable to flex the arm beyond a right angle on account of the anterior displacement of the upper fragment.

Operation.—An incision was made over the epicondyle (external) and the obstruction removed. The wound healed by primary union, but an annoying complication set in, consisting of a paralysis of the fore-arm and the hand. This untoward event probably was caused by the undue pressure, over the nerves, of the rubber bandage used in producing artificial anæmia. Local treatment of paralysis by galvanism and massage re-established in three weeks time flexion and exten-

sion of fore-arm and fingers. The muscular power was fully restored and the function of the elbow became normal.

CASE XII. Amputation at the Shoulder Joint for Traumatism and removal of Neck of Scapula, Acromion Process, and the outer portion of the Clavicle, for extensive Necrosis.—R. L. B.; male; age 31. On August 8th, 1891, while running his saw mill, he accidentally fell on the circular saw, which at the time was running at a high rate of speed, receiving an incised wound in the right axillary region, and fracturing the acromion end of the clavicle, also the acromion process. The excision extended through the pectoral muscle into the axillary space. The wound was sutured with no drainage. Two weeks after the injury profuse suppuration set in and burrowed into the axillary space and down the arm to the elbow, and also posteriorly under the scapula. When the patient came to the hospital on the 23rd of January, 1892, he was greatly emaciated, and was suffering all the symptoms of a prolonged suppuration. January 25th, under ether, the acromion end of the clavicle and acromion process were removed. There was found complete ankylosis at the shoulder joint. Thorough drainage was established. February 1st his condition was becoming worse, and amputation at the shoulder joint was performed, and the coracoid process was also removed. The entire scapula was found necrosed, but the condition of the patient did not permit its removal. He was placed in bed and stimulants administered. He rallied, and for the next few days seemed to improve, but gradually sank and died February 8th from prolonged suppuration.

Miscellaneous cases; forty-eight.

CASE I. Injury to Brachial Plexus, with Complete Paralysis in the Upper Extremity; Recovery. J. D., female, age 18, while coasting was thrown forward from her sled striking a tree on the left humerus. The arm was badly swollen and contused, and there was complete wrist drop. She could flex the middle, ring and little fingers. The biceps, triceps, coracobrachialis, brachialis-anticus, and the deltoid were paralyzed.

Electrical Examination.—The deltoid, biceps, triceps, brachialis-anticus, coraco-brachialis, all the flexors supplied by the median nerve, and all the extensors, do not react at all. The muscles supplied by the ulna nerve, the adductor

pollicis, the pronator radii teres, the lumbricales and interossei act well to galvanism only. There was anæsthesia of the skin of the whole of the fore-arm except a small area on the ulna side.

Treatment.—Daily galvanism was used and at the end of three months time there was marked improvement. In eight months time all those muscles which previously reacted to galvanism alone now react to faradism also. Sensation normal. In one year from the date of the injury she has as good use of the arm as ever.

CASE II. *Tenosynovitis of the Extensor Tendons of the Hand (Tubercular?).*—Operation, incision and dissecting out of the tubercular sac. Recovery.

CASE III. *Fracture of Humerus, Delayed Union, Drilling.*—Captain W. was thrown from a buggy, sustaining fracture of humerus at the junction of upper and middle one-third. The fracture was put up in the usual way and as soon as the swelling had subsided the arm was placed in a plaster-paris spika. At the end of ten weeks time there being no union, irritation was attempted by percussion. This proved ineffectual and at the end of three and a half months, under ether, the ends of the bones were rubbed together. This was again done three weeks later with no better result. The ends of the fragments were now perforated at several points with Brainard's drill. The arm was put completely at rest in appropriate splints, and in six weeks after the punctures had been made there was firm bony union.

CASE IV. *Varicose Aneurism of the Ring Finger; Amputation of Finger at Meta-carpo-phalangeal Articulation; Recovery.*—N. M., female, age 24.

Amputation of Fingers for Various Causes; thirty-four cases.

Cicatricial Contraction of Fingers; two cases.

Cellulitis of Hand and Fore-Arm; eight cases.

This diffuse inflammation of the cellular tissue followed injuries of the most varied description and in each case ended in suppuration and sloughing. The local treatment consisted at first of gentle elastic compression with many layers of moist cotton and the whole covered with oil-silk. In other cases incisions and thorough drainage were established.

Osteoclasy for Mal-union of Ulna; two cases.

LOWER EXTREMITIES.

Fractures and Dislocations; twelve cases.

CASE I. *Re-section of Femur for Mal-union; Recovery.*—B. B., male, age 22, was knocked down by a runaway team, sustaining a fracture of the left femur at the junction of the middle and upper one-third. He entered the hospital seven months after the accident, with mal-union, marked angular deformity, and evident over-lapping of the fragments. The shortening was three and a half inches.

Operation, June 12th.—Ether. An incision four inches long was made over the outer aspect of the thigh, in the region of the fracture. On exposing the bone the two fragments were found over-lapping about three and a half inches, and muscular tissue intervening. The lower fragment projected upward and backwards, and the upper, downwards and forwards. There was considerable formation of new bone on the ends of the fragments. Not until one-quarter of an inch had been removed from the upper fragment and three inches from the lower fragment could the ends of the bones be brought into apposition. Good position having been secured, the ends of the bones were held in place by stout silver wire. The thigh and leg were immobilized by means of heavy wire-gauze splints. The wound was not dressed till the end of four weeks, and it was found nearly healed. The position was good and union fairly firm. In four months time the union was firm. The shortening was three and a half inches. No deformity.

CASE II. *Re-section of the Femur for Mal-union; Recovery.*—B. B., male, age 15, was admitted August 10th. He had received a fracture of the right femur four months previously by direct violence. At the time of his admission there was a two-inch shortening of the right leg and well marked signs of an old fracture at the juncture of the middle and lower one-

third of the right femur, with evident over-lapping of the fragments, and marked angular deformity. The union was not firm and he was unable to walk without the aid of crutches.

Operation, August 15th.—An incision four inches long was made over the seat of the fracture on the outer aspect of the thigh. The fragments were found over-lapping about two inches, the lower pointing upward and outward. The bones were held together with moderate firmness by considerable formation of new bone, and were forcibly separated and brought into apposition by the removal from each end of an inch of bone. They were held in place by stout silver wire sutures. The leg, thigh and pelvis were immobilized by means of a heavy splint. The wound was not dressed for three and a half weeks, when it was found entirely healed.

October 15th.—The position was good and union firm, with two inches shortening. He went about on crutches, but the limb was still kept in splints. He went home December 1st with a useful leg.

CASE III. Un-united Fracture of both Bones of Leg; Wiring; Recovery.—William M.; age 27. Had received a fracture of both bones of the left leg in the lower one-third, by direct violence, three months previous to his admission to the hospital. At the time of his admission there was no union. The shortening was an inch and a half. Under ether the ends were rubbed together and the position maintained by splints and extension. At the end of seven weeks there was no union.

Operation, September 12th.—An incision three inches long was made over the fracture on the anterior surface. The line of fracture was oblique, running from within outwards. About one-quarter of an inch was taken off of the upper fragment of the fibula and three-quarters of an inch off the upper fragment of the tibia, one-quarter of an inch was taken off the lower fragment of the tibia and three-quarters of an inch off the lower fragment of the fibula. The bones were held in place by stout silver wire sutures. The leg and thigh were immobilized by a heavy plaster splint. The wound was not dressed for six weeks, when it was found healed and union

firm. Shortening, one and a half inches. At the end of three months' time he left the hospital with firm bony union and a useful leg.

Amputation Middle One-Third of Femur for Compound Comminuted Fracture.—H. M. N., male, age 30, was admitted April 25th. On March 13th was run over by a heavily loaded wagon, sustaining a compound comminuted fracture of left femur in the lower one-third. When he was first seen at the hospital the thigh was greatly swollen and pus was oozing from several tracts, and all the symptoms of septic infection were present. He had been injured while crossing the desert lying west of the Great Salt Lake and had had no medical aid.

Operation, April 26th; Ether.—Amputation was performed at the middle of the thigh. Rubber drainage tubes were used and a moist bi-chloride dressing 1 to 5,000 applied. Tube removed on fourth day. Temperature rose on the sixth day to 102° F., but there was no evidence of trouble in the stump. The bowels had been severely confined for several days. A brisk cathartic was administered and the temperature was normal the next morning. The wound healed by primary union and he was discharged cured July 21st.

CASE V. Amputation Middle of Leg; Recovery.—S. H., male, age 69. August 7th was kicked by a horse, sustaining a compound comminuted fracture of right leg. On the fifth day after the accident the wound was suppurating freely. When he was admitted to the hospital the leg was tense, swollen, and suppurating freely. Fragments of bone were removed and the wound drained. No betterment.

Operation, 14th; Ether.—Amputation in middle one-third of right leg. Rubber drain. The flaps sloughed and the wound healed by granulation. Secondary operation, September 21st, re-amputation, primary union.

CASE VI.—Amputation Lower One-Third of Leg for Crush.—M. J., male, age 22, was run over by an electric car crushing lower part of leg. He was brought to the hospital on the night of September 26th. The foot and lower part of leg were crushed and filled with dirt. The same night the leg was amputated at the junction of the middle and lower

one-third. Rubber drainage tube was used and removed on the third day; primary union.

CASE VII. *Osteoclasy for Mal-union of Tibia.*—M. G. P., male, age 25, was admitted September 28th, ten weeks after receiving fracture of the right tibia. There was considerable deformity and the union was quite firm. He was given ether and the tibia refractured, straightened, and put up in coaptationsplints, which were taken off October 20th. There was firm bony union and no deformity. Discharged cured November 1st.

CASE VIII. *Amputation Upper One-Third of Leg.*—P. J. T., male, age 20, was run over by an electric car, sustaining a compound comminuted fracture of ankle joint; was brought to the hospital October 28th. The ankle was found crushed and filled with dirt. Amputation lower one-third of leg was performed four hours later. Primary union.

CASE IX. *Amputation Upper One-Third of Thigh: Death.*—T. L. P., age 16, shepherd. Was herding his sheep and on going down a steep hill fell, throwing his gun in front of him, which discharged, the ball passing through the lower part of the femur, producing a compound comminuted fracture of the femur; calibre 45. He lay for twelve hours where the accident happened before he received any assistance. He was taken home and two days later, October 1st, was brought to the hospital. The femur was found splintered high up.

Operation, October 2nd; Ether.—Amputation was performed at the upper one-third of the thigh. He was in bad condition at the time of the operation. He never rallied and died ten hours later from shock.

CASE X. *Amputation Lower One-Third of Thigh for Gunshot Wound; Death.*—M. A. B., male, age 13, while out hunting was accidentally shot through the right knee; calibre 38. Admitted to the hospital November 5th. There was found a compound comminuted gunshot fracture of lower extremity of left femur, the ball passing through the condyles. Amputation in the lower one-third of thigh was performed twelve hours after the injury. He never rallied and died fourteen hours later from shock.

CASE XI. *Gunshot Wound of Leg, Gangrene; Amputation Lower One-Third of Thigh; Death from Tetanus on the Tenth Day.*—C. L. D., male, age 20, while duck-hunting accidentally shot himself in the right leg. The entire charge of shot was discharged into the right leg, tearing away almost the entire outer muscular part of the leg. The fibula was comminuted and the flesh was terribly lacerated on the outer side of foot and ankle. The entire wound was powder burned. Shot, wadding, and bits of clothing, as much as could be, were removed from the ankle joint and the tarsal articulations. The wound was dressed with heavy antiseptic dressing and kept moist in a solution of bi-chloride 1 to 2,000. Gangrene set in on the second day, and on the sixth day the limb was amputated in lower one-third of thigh. On the eighth day symptoms of tetanus set in. He first complained of sore throat, with inability of opening mouth to its full extent. Mastication and deglutition became difficult. Rapidly the painful contraction and the rigidity extended to other muscles near. The lips were drawn apart (risus sardonicus), and the neck drawn back. The thorax became rigid; respiration rapid and shallow; pulse small and feeble and the whole face expressed the most intense suffering and anxiety.

As the disease advanced all the muscles of the trunk became hard and rigid.

The paroxysmal attacks came on every few minutes with the most violent contractions, twisting his body into inconceivable positions, till death resulted from asphyxia, two days from the onset of the attack. He was conscious to the last.

(b.) NEOPLASM.

CASE I. *Sarcoma of the Fibula; Amputation at Knee Joint; Recovery.*—M. S., male, age 39; farmer by occupation; admitted December 20th. General health has always been good until recently. When about 17 years old he first noticed a lump on the upper and outer surface of the left leg. This lump remained about the size of an orange till about three years prior to his admission, when it increased rapidly in size and became painful, so much so that he was unable to attend to his occupation. When he entered the hospital he was suf-



Anterior.



Posterior.

fering considerable pain and was using a cane. Examination showed a large, hard, nodular tumor on the outer aspect of the left leg, just below the knee. Very tender on pressure, and in some places showed areas of softening. There was marked atrophy of muscles of thigh. No glandular enlargements.

Operation, December 23rd.—Ether. Stephen Smith's method of amputation at knee joint was performed. Drainage tubes were used, and were removed on the fourth day. The wound healed by first intention and he was discharged, cured, January 25th, 1892.

Pathologist's Report.—The tumor sprang from the upper one-third (outer aspect) of fibula. Was nodular, with evidences of softening, and measured, in circumference, twenty-six inches. Round and spindle-celled sarcoma.

(c.) TUBERCULAR DISEASE.

CASE I. *Tubercular Synovitis of the Knee; Arthrotomy; Recovery.*—A. T. B., male, age 24, was admitted March 27th, with a tubercular history on the father's side. One year before his admission his right knee began to swell, and when he entered the hospital there was a marked redness and tenderness, and was four and one-half inches larger in circumference than the other. The movements of the joint were limited and very painful.

Operation, March 30th.—Two longitudinal incisions were made on each side of the patella, opening the joint. The synovial membrane, being found in an advanced state of tubercular disease, was removed. The articular ends of the bone did not seem to be involved. Recovery was rapid and he left the hospital with the functions of the joint fully restored. He was heard from eight months later and had had no return of the trouble.

CASE II. *Amputation of the Lower One-Third of Thigh for Tubercular Arthritis of the Knee; Recovery.*—M. T., male, age 21, admitted October 22d. His general health had always been good, but with tubercular history on his mother's side. No evidence of tubercular deposit in lungs. Two and a half years ago received a slight injury to the knee, since

which time the joint has gradually increased in size, attended with pain and tenderness. He was treated in Chicago by parenchymatous and intra-articular injections of iodoform. He was discharged as cured. He came to this territory, where he lived for the next six months, apparently free from the disease, when the trouble broke out anew. When he entered the hospital the knee joint was enormously swollen, accompanied by great pain and tenderness. Mobility was entirely gone and the leg was fixed at angle of about 150° . Fluctuation was present. Patella slightly movable.

Operation, October 23rd; Ether.—A transverse incision was made through the middle of the patella opening the joint. The disease had so much invaded the lower end of the femur and the articular end of the tibia that excision was impossible, and amputation was at once performed. It was found necessary to make a section of the femur at the junction of the middle and lower one-third. Drainage tubes were used, but on the second day secondary hemorrhage set in, which necessitated the opening of the flaps, when it was found that there was profuse oozing from the bone. The end of the bone was packed with styptic cotton, but the hemorrhage was not entirely controlled for several days. The wound healed by granulation, and on December 20th re-amputation was done, at which time two inches of the bone was removed. Primary union followed. The pathologist reports a typical tubercular disease of the joint.

CASE III. *Tuberculosis of Ankle Joint; Atypical re-section; Subsequent Amputation in Lower One-Third of Leg.*—L. P., female, age 20. Mother and father both living and in good health. An uncle on mother's side died of phthisis pulmonalis. Two sisters and six brothers living and in good health.

Previous History.—When seven years old she sprained her right ankle, which gave her no trouble till July, 1889, when the joint became stiff and painful, and she was unable to walk for some time. In July, 1890, there was a repetition of the same trouble, and when she was admitted to the hospital, January, 1891, the ankle was swollen, painful and discharging on the inside of the ankle just below the joint. There was no history of having sprained the ankle the second time. In

January, 1891, atypical resection of the ankle joint was performed through two lateral incisions for osteo-tuberculosis. The operation consisted in the extirpation of the tubercular capsule and of the removal of tubercular foci in the epiphysial extremity of the tibia and the external malleolus. Deeply-seated osseous foci were found in the articular surface of the astragalus, which were thoroughly scraped out by the free use of the sharp spoon. After iodoformization the incisions were closed with drainage. Foot placed on splint and retained by wire-gauze. At the end of twenty days union good except at points of drainage. With exception of a small connective-tissue abscess, recovery was uninterrupted; patient walked on crutches at the end of the third month, and left the hospital four weeks later greatly improved in general health, and with good motion of the ankle joint. In the following December the ankle and leg became greatly swollen and painful, when she returned to the hospital. The previous incisions were open and discharging freely.

Operation, January 15, 1892.—Amputation in lower one-third of leg; primary union; discharged March 25th cured.

CASE IV. *Anchylosis of Knee Joint: Amputation Lower One-Third of Thigh; Recovery.*—A. D., male, age 24. Admitted August 20th. Both parents tubercular. Has had repeated attacks of inflammation of right knee and since the last attack one year previous to his admission, the knee has been ankylosed at a right angle. His general health has not been the best. The affected knee was enlarged three inches. Amputation just above the condyles was performed, rather than excision of the knee, because the patient preferred the use of an artificial appliance rather than a stiff leg, in fact would submit to the former operation only.

Operation, August 22nd.—Amputation of femur three and a half inches above the knee, as the most suitable place for artificial appliance. Tubes removed on third day; primary union; discharged August, cured. Eight months after leaving the hospital was wearing the appliance and attending to his duties.

CASE V. *Excision of the Knee Joint for Tubercular Arthritis; Recovery.*—M. B., female, age 28, and mother of three

children; admitted April 27th. Tubercular history on mother's side. One year prior to her admission she received a slight injury to her right knee. Some stiffness in the joint remained, which was followed by a painless enlargement of the joint, but for two months the pain had been constant, and when she entered the hospital, the knee was greatly swollen. Temperature, 103° F.; pulse, 110; fluctuation present.

Operation, April 29th.—A transverse incision was made through the middle of the patella, followed by escape of tubercular pus. The ends of the bones were excised and held in place by stout silver wires. Drainage tubes were inserted and the wound dressed with heavy antiseptic dressing, and a stout wire-gauze splint applied externally. She made an uneventful recovery and was discharged June 15th.

CASE VI. *Excision of Knee Joint for Tubercular Arthritis.*—A. B. S., male, age 29. A strong, healthy-appearing man, with no family history of tuberculosis. Had for the last three and a half years suffered from knee joint trouble. On admission to the hospital, November 1st. there was found a uniform enlargement of the joint, together with fluctuation. His temperature was 102½° F.; pulse, 105.

Operation.—Complete re-section of the knee joint, including patella. On section of the femur the bone appeared highly osteoporotic. On the inner condyle was found a small sequestrum surrounded by granulation tissue, and corresponding to this, a caseous deposit was found on the inner tuberosity of the tibia. Both articular extremities were sawn across and removed, together with the synovial membrane and ligaments of the joints. After thorough iodoformization of the wound the bones were brought together and wired. Drainage tubes were inserted, and a copious anti-septic dressing was applied and retained by a wire-gauze splint. The limb was kept in an elevated position for ten days. The temperature never rose above 100.5° F., and at the first dressing, on the twentieth day, union was complete except at the points of drainage. Examination at the end of the eighth week showed consolidation well advanced, with an inch and a quarter shortening. At the end of three months he was able to get about without any inconvenience.

CASE VII. *Excision at Knee for Tubercular Arthritis, with subsequent amputation at Lower One-Third of Thigh.*—T. B. C.; male; age 36. Was admitted into the hospital April 1st with the following history: At an early age he fell, injuring his right knee. Some stiffness of the joint remained but did not cause him much inconvenience until about a year and a half ago, when he received a second injury to the same knee, followed by an enlargement of the joint and attended with almost constant pain. No history of tuberculosis in his family.

Present Condition.—Patient anæmic; knee ankylosed and enlarged, with the point of fluctuation on the outer side of the patella tendon, likewise the point of greatest tenderness. The pulse is small and weak, and there is a slight rise in temperature at night, attended with profuse sweating. He has a slight cough and a tubercular deposit in the left lung.

Operation.—Complete re-section of the knee joint, including the patella. The articular surfaces were found to be the seat of a well advanced tuberculosis. After performing a typical re-section of the joint, and iodoformization of the wound, the bones were brought together and wired. Drainage tubes were inserted and the usual dressing applied. The temperature continued high for a number of days, being as much as 105° F. on the tenth day. The wound was suppurating freely and the patient's condition was becoming worse. Amputation of the lower one-third of the thigh was performed on the fifteenth day, with an immediate betterment of his symptoms. The wound healed by primary union, and he was discharged cured.

CASE VIII. *Tuberculosis of Hip Joint; Re-section of Hip Joint, and subsequent amputation at Hip.*—W. D., male, age 20. Was admitted March 24th with well marked, advanced tubercular disease of the hip joint, of three years' duration. There were several sinuses from which pus was flowing freely.

Operation, March 26th.—Re-section of the head of the femur; three weeks' later amputation at the hip was performed. The wound continued to discharge for some time. He was rapidly becoming emaciated from the hectic fever and

profuse purulent discharge. The acetabulum was freely exposed and scraped. The wound healed slowly and he left the hospital much improved in his general condition.

CASE IX. *Tuberculosis of Hip Joint; Re-section; Recovery.*—M. L., female, age 9, admitted March 7th with well advanced tubercular disease of hip. Resection of head of femur was performed March 10th. The wound healed slowly, and she left the hospital June 10th much improved in health and with a useful joint.

CASE X. *Tuberculosis of Hip Joint; Excision; Recovery.*—W. G., age 10; female. The operation consisted in the removal of the head and neck of femur; healed slowly.

CASE XI. *Tuberculosis of Hip Joint; Excision; Recovery.*—M. D., female, age 12; admitted September 18th. Excision of head of femur only; healed slowly.

CASE XII. *Tuberculosis of Ankle Joint; Amputation at Lower One-Third of Leg; Recovery.*—A. D.; female; age 18.

(d) INFLAMMATORY.

CASE I. *Gangrene: Amputation Upper One-Third of Thigh; Recovery.*—H. H., male, age 23, was admitted to the hospital January 10th, complaining of intense pain in left leg. He gives the following history: Father and mother living and in good health. During his early childhood was always sickly, and at about ten years old began to suffer with severe sick headaches. When 20 years old he received a severe injury to the abdomen just above the pubes, and passed what seemed to be pure blood, with a great and frequent desire to urinate. He recovered from the injury and was perfectly well up to four or five weeks previous, when he was attacked with a severe headache attended with severe pain in the umbilical region, which lasted for three or four days. The pain on leaving the abdomen was felt most severe in the right leg, with numbness of the foot. The pain in the calf of the leg was most intense, especially on pressure. There is no specific history. On examination a localized indurated spot about the size of a silver dollar was found in the calf of the leg in the soleus muscle, exquisitely tender on pressure. There were evidences of dementia. January 13th an incision was made over the indurated spot and not even one drop of blood was

present, venous or otherwise. The pulsation of either femoral could not be made out, although the radial pulse was felt strong, and regular. The right leg was also numb. The indurated muscle was abnormally friable, semi-opaque, pale, slightly lustrous, and of a redish grey color. The appearance of a coagulated necrosis. January 17th process of gangrene has set in from the point of incision and is extending in all directions; toes are beginning to be discolored, numbness beginning in the toes of the right foot, temperature 104.5°, pulse 140, pulsation of either femoral can not be felt, but the pulsation of abdominal aorta is distinctly felt. January 18th the line of demarcation not established. January 20th amputation in upper one-third of thigh. The flaps sloughed and amputation at hip was performed. Primary union. The arteries were found hard and thick and the lumen almost obliterated. He was discharged cured February 27th.

CASE II. *Bursitis Praepetallaris*.—J. G. F., male, age 54, miner by occupation, was admitted in June. About a year previous first noticed, just below the knee, a swelling, attended with very little or no pain, which increased till about four inches in length, extending up over the patella. He gives the following history: Had been a miner for about sixteen years, where the work very often, especially in small places, required the men to work on their knees.

Operation.—Ether. An incision was made over the fluctuating swelling, and the sac, the walls of which were found very dense and thick, was dissected out. The cavity was distended with a clear and serous fluid. The interior was rough and irregular, covered with warty nodules, and traversed by thickened bands. There were also definite pedunculated outgrowths with floating cartilaginous ends. The incision was closed with drainage and recovery was rapid and perfect.

(e) MISCELLANEOUS.

Lisfranc's Operation for Frost-Bite; four cases.
Chopart's Amputation for Frost-Bite; two cases.
Syme's Operation for Crushed Foot; one case.

Foreign Body in Knee Joint; two cases. In the first case cocaine was used and the floating body re-

moved through a small incision. In the second case the operation was performed under ether, and an incision made to the outer side of the patella tendon. Two large pieces of floating cartilage were removed. Primary union followed in both cases.

Re-amputation for Painful and Adherent Cicatrices; ten cases.

Amputation of Toes for various causes; fifteen cases.

OPERATIONS ON BONES.

For Necrosis.—In this operation it was customary to make a free incision so that the diseased bone could be both seen and felt; chisels, curettes, gouges, and trephines were employed to obtain a thorough removal of all diseased bone. Where the operation was not extensive, the limb was rendered bloodless by elevation for four or five minutes, but in any case of magnitude Esmarch's bandage was employed. The after treatment consisted in filling the cavity with iodoform gauze and covering the wound with a large antiseptic dressing. The majority of the cases were of tubercular origin, and in these general measures were adopted in addition.

Tibia.—Nine cases of necrosis of the tibia were treated.

In *one* of these there was a total central necrosis of the shaft, and in *another* there was almost total central necrosis of the shaft. In operating the periosteum was spared and the entire canal of the bone was opened, and a sequestrum, almost a perfect cast of the interior of the bone, together with a portion of the involucrum, were removed. Healing was slow and sinuses remained for weeks, but recovery was finally perfect.

In *three* of the cases there was simply acute osteitis, where an incision was made down to the bone and drilled, thus relieving the tension.

In *one* case there was found some thickening and hardening at the upper end of the tibia, attended with a persistent gnawing, boring pain, worse at night. An opening was made with gouge and chisel, and a focus of tubercular softening about the size of a cherry, was discovered. This was curetted, with relief of symptoms.

In *two* other cases injuries to the bone had been received several years previous, followed by osteo-periostitis and some superficial caries. This was treated by an incision and scraping of the diseased bone.

In another case there was necrosis following a compound fracture. Incision for removal of the diseased bone.

Foot and Ankle.—There were four cases in which the disease affected the lower extremities of the tibia, fibula and astragalus. These all recovered, and, though the range of motion in the ankle was impaired, yet the joint was a useful one.

Fibula.—There were two cases of necrosis of the fibula following gunshot wounds. Incision and removal of dead bone.

Femur.—Ten cases of necrosis of femur were operated upon.

In one case there was necrosis of the diaphysis following acute osteo-myelitis, complicated with spontaneous fracture. The limb was amputated at the hip, using Wyeth's method of applying tourniquet. It was found that the disease had extended to the acetabulum and ilium, the latter were curetted. The wound was slow in healing and sinuses persisted for a long time.

Four cases were for necrosis following gunshot

wounds; incision and curetting; recovery was prompt.

Three cases for necrosis following compound fractures; incision and curetting; recovery prompt.

Two of the cases were post-typhoidal.

Humerus.—Two cases were operated upon for necrosis affecting the humerus. The patients both recovered with a strong arm.

Maxilla.—Four cases of necrosis of the lower jaw, and three of the upper jaw, were all due to infection of organisms of suppuration through carious teeth. In one case the half of the lower jaw was removed. They all made a satisfactory recovery.

Ribs and Sternum.—Three cases were operated upon for necrosis of the sternum, and four for necrosis of the ribs, all were post-typhoidal. Recovery in each case satisfactory.

Fingers.—Ten cases for necrosis of the phalanges and meta-carpal bones. Result satisfactory.

Necrosis (tubercular?) of tuberosity of ischium. Incision and curetting. Improved.

ORTHOPEDIC.

Talipes; thirty-six cases.

In twelve of the cases the feet could be brought into proper position. These were treated by immobilization of the foot and leg, by plaster of paris, the parts being protected by cotton and carried sufficiently high up to prevent its ready displacement, necessitating frequent removals and reapplication of the plaster.

In two aggravated cases of long standing in which mark change in the shape of the bones, in the length and position of the ligaments, and in the connective tissue of the foot, rectification was brought about in one case by free incision made through all the soft parts of the sole of the foot. In the other case cuneiform osteotomy was performed in addition to the free incision through all the soft parts of the sole of the foot.

In talipes equinus and equino-varus, comprising the rest of the cases, the tendons were divided, frequently the plantar fascia also. The foot was forcibly carried to a little beyond the normal position, and was maintained in place by the application of a plaster of paris bandage.

All of these cases ran the customary afebrile aseptic course. In several weeks' time in various cases the patient was given a club foot shoe and instructed to walk.

Pes Planus; one case. Treatment consisted in hygienic measures, and locally, a steel artificial arch under the sole with an internal lateral offshoot. In a short time he was able to attend to his duties as policeman.

Hallux Valgus; five cases. The displacement of the great-toe in each case was extreme and troublesome, and associated with bunion. The treatment consisted in each case of complete ex-section of the joint.

Hammer-Toe; two cases. In one case the toe was removed and in the other the joint excised.

OPERATIONS ON NERVES.

Excision of Meckel's Ganglion, and Neurectomy of the Inferior Dental Nerve; success. The patient was a man of 40, who had up to five years ago enjoyed good health, at which time he began to suffer from neuralgia of right side of the face. The cause of which was unknown. The pain would begin with a jerk in the upper jaw, extending over the face, would shoot down through the lower jaw to the chin and along the right side of the tongue. At other times it would begin by a sharp darting pain under the eye, which could some times be started by touching the part or washing the face in cold water. The pain at first intermittent had now become almost constant, and was worse in stormy weather. At another time the pain would be felt in the temporal fossa, in the lower eyelid, at the side of the nose and in the upper lip. The eye would water and the tears stream down his face. The pain was often so great that it would waken him from his sleep. He gradually lost flesh, appetite and sleep, and was unable to eat solid food owing to the pain induced by movements of the jaws. Medical treatment of all kinds had been tried without avail. Meckel's ganglion was removed by modification of Carnochan's operation, as follows: An incision was made in the cheek with its center opposite the infra-orbital canal. A portion of the anterior wall of the antrum was removed with a half-inch trephine. A

slender probe was passed as a guide along the infra-orbital canal, and the floor of the latter was carefully cut away from below with bone scissors until the posterior wall of the antrum was reached, care being taken not to divide the nerve. A portion of the posterior wall of the antrum was removed by chisel and mallet. The ganglion was easily found by tracing the nerve back. With a pair of curved scissors the ganglion was separated from its other branches and removed. The hemorrhage after the posterior wall of the antrum had been removed was troublesome, but was controlled by pressure. Great care was taken not to lacerate the tissues posterior to the antrum by the chisel and mallet. The deeper part of the operation was rendered easier by aid of a reflecting light. After removal of Meckel's ganglion, neurectomy of the inferior dental nerve was performed as follows: The mouth being opened as widely as possible, an incision was carried along the anterior border of the ramus of the lower jaw, extending from the last upper molar to the corresponding tooth in the inferior maxilla; the mucus membrane being divided the finger was inserted between the internal pterygoid and the ramus of the jaw, feeling for the sharp spike of bone, the orifice of the inferior dental canal. The nerve was caught up by a curved aneurism needle as it enters the foramen and about an inch of it removed. Ten days after the operation the patient was free from pain and was able to eat solid food without inconvenience. His appetite came back and he slept well. On testing sensation several months later it was found that on the affected side there was diminution of sensibility on the side of the nose, the lower eyelid,

and the right portion of the upper lip. Fourteen months after the operation he remained well and has had no return of the pain.

Nerve Stretching; there were five cases of sciatica treated by nerve stretching. All of these were inveterate cases which resisted every form of conservative treatment. Four were entirely cured by the operation, and one experienced marked relief. The method pursued was as follows: Under an anæsthetic the thigh was flexed on the abdomen and the leg kept extended upon the thigh. The sciatic nerve together with all the tissues on the back of the thigh were put on the stretch. In this bloodless stretching of the nerve the results are often quite as satisfactory as those obtained by making an incision down to the nerve before endeavoring to stretch it. The patients were kept in bed a couple of weeks and then allowed to go about.

MISCELLANEOUS CASES.

CASE I. *Lipoma of Back*.—Excision and removal of a large fatty tumor.

CASE II. *Lupus Vulgaris of Forehead*, about the size of a quarter dollar.—Elliptical incision; primary union.

CASE III. *Ungual Exostosis*.—A large outgrowth on the distal phalanx of the great toe. Operation; removal of growth, and the base well leveled down to the bone and scooped out. The outgrowth returned several months afterwards and the toe was amputated at the last joint.

CASE IV. *Coccygodynia*.—H. P., female, age 35, a typical neurasthenic. She had been subjected to a number of gynecological operations. She complained of a constant pain in the coccyx, aggravated by sitting down. There were no local signs of inflammation, no evidence of displacement. The coccyx was removed and the wound closed without drainage. Primary union. There was marked improvement in her condition.

CASE V. *Hypospadias, of the Peno-Scrotal Variety*.—Treated by Duplay's method. The first step in the operation consisted in freeing the penis and dividing the band which curves the organ downwards. After healing from this operation the glans was tunnelled, and a new urethra was formed. Improved.

Psoas Abscess.—Seven cases. Incision and drain-

age. One of these cases was bi-lateral, and drainage at each side was effected by trephining through the ilium.

Lumbar Abscess.—Seven cases. Incision and drainage.

Cellulitis of Foot and Leg.—Twelve cases.

Cystitis.—There were thirteen patients treated for chronic cystitis. The treatment consisted in overcoming the mechanical interference, with complete evacuation of the bladder, by a mechanical treatment or operation as the nature of the case demanded. The tenesmus was treated by injections of nitrate of silver to the prostatic-vesical region. The solution was repeated every second or third day, at first very dilute, and its strength gradually increased to ten per cent. The bladder was irrigated with warm antiseptic solutions. Of these the most frequently used was nitrate of silver, five to ten grains to the ounce. An attempt was made to render the urine sterile by the use of salol and boric acid per os. Counter irritation and the judicious use of salines were also found of use, and the patients were put on milk diet. Large improvement invariably took place.

Pott's Disease of the Spine.—Six cases. Each treated by the suspension of the patient and a plaster jacket applied.

Wounds.—A great number of wounds (113) were successfully treated in accordance with modern methods.

Removal of Superfluous Hair by Electrolysis; five cases.

FRACTURES AND DISLOCATIONS.

(a) FRACTURES.

In the following cases of fractures, no case of non-union has occurred. In every case the patient has recovered without appreciable deformity and with perfect restoration of function, with the exception of an intra-capsular fracture, and a fracture of the twelfth dorsal vertebra. The seat of fracture and the dressings were as follows:

Acromion Process; one case. Velpeau bandage.

Clavicle; twelve cases. A Velpeau bandage was applied to five of the cases; Sayre's apparatus to three of the cases, and S. W. Smith's apparatus to four of the cases. At the end of three or four weeks the bones were firmly united and in good position.

Femur; eleven cases. Three of these were intra-capsular. Extension was made by means of a stirrup to which was attached a cord passing through a pulley placed at the foot of the bed and bearing the weight at the other extremity. The adhesive straps forming the stirrup were carried up as far as the upper end of the lower fragment, and applied to the limb by a roller bandage. Lateral support was obtained by means of a long side splint, reaching to the axilla. A roller bandage was then applied to the limb and long side splint. The amount of weight employed depended upon the degree of shortening, beginning with a moderate weight. The limb was measured from day to day, and weight

gradually added to the extension, till the shortening was overcome. The patients were treated on a hard mattress with the foot of the bed elevated. In no case was the shortening after recovery greater than three-quarters of an inch.

The intra-capsular fractures were treated by the application of a plaster paris spika extending from the toes. The results were all that could be desired.

Fibula; nine cases. Limb was fixed in a fracture box in four cases, and in five cases in plaster paris.

Humerus; eight cases. Dressed on internal right angle splints.

Maxilla (inferior); six cases.

Maxilla (Superior); three cases. There was no displacement, consequently no dressing required.

Patella; three cases. Agnew's splint was applied.

Radius and Ulna; five cases. Anterior and posterior co-aptation splints, the hand being held in the semi-prone position.

Radius (Colles); eight cases. Antero-posterior co-aptation straight splints were applied, extending from the elbow joint to the middle of the carpus. Results were satisfactory in all cases.

Tibia; four cases. The limb was fixed for the first few days in a fracture box, and then placed in plaster paris.

Tibia and Fibula; ten cases. When possible, extension was applied and the limb fixed in a fracture box.

Ribs; twelve cases. The affected side was immobilized by broad bandages.

Vertebra (Twelfth Dorsal): one case. The patient was paraplegic.

(b) DISLOCATIONS.

Dislocation of the Shoulder; six; four subglenoid, and two subcoracoid, were reduced under ether. The cases were recent and reduction was accomplished without difficulty.

Dislocation of the Scapula; caused by direct violence to the shoulder. In this case the acromion process of the scapula was forced beneath the clavicle. The treatment consisted in drawing the elbow well backwards and applying a pad over the clavicle, the pad and elbow being fixed in position by means of a bandage passed over the clavicle and around the elbow.

Dislocation of the Hip; seven cases were reduced under ether. These cases were all recent and reduction by manipulation was accomplished without difficulty.

Dislocation of the Knee; one case. This consisted of dislocation of the head of the tibia backward. Dislocation was complete, the crucial ligaments were torn and the parts about the joint suffered extensive injury from laceration. Reduction was accomplished with the application of extending force.

AMPUTATIONS.

The following 104 cases of amputations have been recorded just as they occurred, either for injury or disease, and the salient features of each are given in a tabulated form below. The flaps were made as follows:

For the leg, Sédillot's method, or the circular method with periosteal reflection (Bryant, J. D.); for the knee, Stephen Smith's lateral flap method; for the thigh, antero-posterior, modified circular and musculo-cutaneous flaps; for the hip, Wyeth's bloodless method; for the fore-arm, antero-posterior musculo-cutaneous flaps, made from without inward; for the arm, modified circular flaps; for the elbow, circular method; for the shoulder, circular method; for the foot, Lisfranc's, Chopart's and Syme's amputation.

In several cases in which amputation was performed for injury, it was impossible to secure the usual flaps on account of the destruction of the integument. In these cases it was necessary to modify the plan, using what tissue was available. The vessels were tied high above any perforating branch, and the nerves pulled down and cut off high up. In no case was there secondary hemorrhage. Strands of sterilized cat-gut or fenestrated rubber tubing were used for drainage, which were generally removed at the end of 48 hours. Healing was usually complete at the end of two or three weeks. In those cases where healing was by granulation the cicatrix together with a V-shaped piece was taken out, and if necessary the end of the bone removed. Primary union following in each case.

NO.	SEX.	AGE	CAUSE.	PART AMPUTATED.	ULTIMATE RESULTS AND REMARKS.
1.	M.	19.	Co. com. fracture of foot. Railroad accident.	Lower one-third of leg. Circular method with periosteal reflection, and oblique coaptation of the flaps. (Bryant, J. D.)	Recovered Symmetrically tapering, and exceptionally serviceable stump. Artificial appliance worn.
2.	M.	75.	Epithelioma of foot.	(1) Ankle joint. Syme's amputation. (2) Amputation at the knee joint. Lat- tural flap method. (Stephen Smith's operation.)	(1) The growth returned in less than two month's time, and the leg was (2) amputated at the knee. Primary union followed, and he left the hospital. The disease re- turned, and he died in three months from date of second operation from exhaustion.
3.	M.	45.	Necrosis of stump.	Middle of leg. Sédillot's method.	Primary union. Serviceable stump. Artificial appliance worn.
4.	M.	40.	Co. com. fracture of leg. Foot and leg crushed in a mine.	Middle of leg. Circular method with periosteal reflection. (Bryant, J. D.)	Drainage. Primary union. Serviceable stump. Artificial appliance worn.
5.	M.	6.	Co. com. gunshot fracture of femur.	Hip joint. Wyeth's blood- less method.	Died two hours later from shock.

NO.	SEX.	AGE.	CAUSE.	PART AMPUTATED.	ULTIMATE RESULTS AND REMARKS.
6.	M.	35.	Co. com. fracture of tibia et fibula. Foot and leg crushed by large boulder.	Knee joint. Lateral flap method. (Stephen Smith.)	Primary union.
7.	M.	33.	Gangrene following frost-bite of feet.	Amputation at left knee. Lateral flaps. (Stephen Smith). Right leg at middle portion. Circular method with reflection of periosteum. (Bryant, J. D.)	Died 24 days after operation, from exhaustion. Left hemiplegia. Bed sores. Flaps sloughed.
8.	M.	29.	Co. com. fracture tibia et fibula. Run over by cars.	Upper one-third leg. Double antero-posterior flap method.	Primary union.
9.	M.	16.	Extensive necrosis of humerus following injury.	Shoulder joint. Amputation by circular incision at a point corresponding to the insertion of deltoid, and a longitudinal incision from the anterior border of the acromion process the whole length of the stump.	Primary union. A stump, with a marked degree of firmness.
10.	M.	45.	Co. fracture of ankle-joint. A steel rail falling on the ankle.	Lower one-third of leg. Circular method, with periosteal reflection. (Bryant, J. D.)	Primary union.

NO.	SEX.	AGE.	CAUSE.	PART AMPUTATED.	ULTIMATE RESULTS AND REMARKS.
11.	M.	50.	Tubercular arthritis of ankle-joint.	Middle of leg. Sédillot's method.	Primary union.
12.	M.	29.	Tuberculosis of shoulder-joint.	Amputation at shoulder-joint by circular incision.	The scapula and clavicle were involved in the disease, which were removed after recovery from the amputation at the shoulder. The wounds healed slowly, and he was discharged from the hospital improved. He died 2½ years later from general tuberculosis.
13.	M.	19.	Tuberculosis of knee joint.	Middle of thigh. Circular integumentary flap method.	Primary union except at point of drainage.
14.	M.	21.	Gunshot fracture lower extremity of femur.	Middle of thigh. Circular integumentary flap method.	Primary union.
15.	M.	35.	Co. fracture of ankle joint. Wheel passed over ankle.	Middle of leg. Double antero-posterior flap method.	Flaps sloughed. Secondary union. Re-amputation and removal of adherent cicatrix.
16.	M.	42.	Co. com. fracture of hand and fore-arm. Caught in machinery.	Middle of fore-arm. Antero-posterior musculo-cutaneous flaps.	Primary union.

NO.	SEX.	AGE.	CAUSE.	PART AMPUTATED.	ULTIMATE RESULTS AND REMARKS.
17.	M.	25.	Extensive necrosis of femur following injury.	Upper one-third of thigh. Modified circular operation.	Drainage. Primary union.
18.	M.	19.	Necrosis of tibia.	Middle one-third leg. Circular flap method with periosteal reflection (Bryant, J. D.)	Primary union.
19.	M.	17.	Extensive necrosis of femur. Tubercular.	Hip joint. Wyeth's bloodless method.	Suppuration and subsequent curetting of acetabulum. The disease had been in progress many years. Recovery slow.
20.	M.	35.	Osteo-tubercnlosis of lower extremity of tibia and ankle.	Middle one-third of leg. Circular method with periosteal reflection (Bryant, J. D.)	Primary union. Artificial appliance worn.
21.	M.	55.	Co. com. fracture of elbow joint. Railroad accident.	Lower one-third of arm. Circular-flap method.	Primary union.
22.	M.	50.	Co. dislocation of ankle joint. Fell 40 ft. down shaft of mine.	Lower one-third of leg. Circular method with periosteal reflection. (Bryant, J. D.)	Primary union. Good serviceable stump. Artificial appliance worn.

NO.	SEX.	AGE.	CAUSE.	PART AMPUTATED.	ULTIMATE RESULTS AND REMARKS.
23.	M.	29.	Co. fracture of leg. Caved on in a mine.	Middle of leg. Sédillot's method	Primary union. Serviceable stump.
24.	M.	21.	Tubercular elbow joint.	Lower one-third of arm. Circular flap method.	Primary union. The usual methods prior to operation had been tried with no avail.
25.	M.	65.	Spontaneous fracture of tibia following infiltration of that bone from a long indolent ulceration which had undergone a malignant change.	Knee joint. Lateral flap method (Stephen Smith's.)	Improved.
26.	M.	30.	Necrosis of carpus. Tubercular.	Lower one-third of fore-arm. Antero-posterior musculo-cutaneous flaps.	Primary union.
27.	M.	37.	Co. fracture of leg. Railroad injury.	Middle of leg. Sédillot's method.	Not seen till twelve days after injury, when suppuration had set in. The flaps sloughed and re-amputation was performed, followed by primary union.
28.	M.	34.	Hand torn from fore-arm and co. fracture of fore-arm. Injured in blasting.	Middle of arm. Double antero-posterior flaps.	The tissues were greatly contused and lacerated. Primary union.

NO.	SEX.	AGE.	CAUSE.	PART AMPUTATED.	ULTIMATE RESULTS AND REMARKS.
29.	M.	38.	Sarcoma of lower end of femur.	Middle of thigh. Circular integumentary flap method.	Primary union.
30.	M.	38.	Caries of carpus. Tubercular.	Lower one-third of fore-arm. Antero-posterior musculo-cutaneous flaps.	Primary union.
31.	M.	29.	Co. com. fracture of ankle. Railroad injury.	Lower one-third of leg. Circular method with periosteal reflection. (Bryant, J. D.)	Primary union.
32.	M.	38.	Com. gun-hot fracture of femur. Calibre, 45.	Upper one-third of thigh. Circular integumentary flaps.	Primary union.
33.	M.	42.	Long indolent ulcer of leg, following scald.	Middle of leg. Circular method with periosteal reflection. (Bryant, J. D.)	Primary union.
34.	M.	40.	Co. com. fracture of ankle. Foot and ankle crushed by a large boulder.	Lower one-third of leg. Circular method with periosteal reflection. (Bryant)	Primary union. Artificial limb worn.
35.	M.	17.	Extensive necrosis of femur and hip. Tubercular.	Hip joint. Dieffenbach's circular method.	No primary union. Wound healed by granulation.

NO.	SEX.	AGE.	CAUSE.	PART AMPUTATED.	ULTIMATE RESULTS AND REMARKS.
36.	M.	40.	Co. com. fracture of foot and ankle. Crushed in railroad accident.	Lower one-third of leg. Circular method.	Primary union.
37.	M.	52.	Co. com. fracture of arm and fore-arm. Railroad injury.	Middle of arm. Circular flap.	Primary union.
38.	F.	14.	Extensive necrosis of femur, following injury.	Upper one-third of thigh. Circular integumentary flap.	Primary union.
39.	M.	22.	Co. fracture of elbow. Fell 20 feet from a scaffold.	Elbow joint. Circular method.	Primary union.
40.	M.	16.	Co. fracture of leg. Kick of a horse.	Middle of leg. Scéillot's.	Primary union.
41.	M.	26.	Crush of foot. Electric car passed over foot.	Lower one-third of leg. Circular method with periosteal reflection. (Bryant, J.D.)	Primary union.
42.	F.	27.	Periosteal sarcoma of tibia.	Lower one-third of thigh. Circular integumentary flap.	Primary union.
43.	M.	23.	Frost-bite of foot.	Lisfranc's operation.	Primary union.

NO.	SEX.	AGE.	CAUSE.	PART AMPUTATED.	ULTIMATE RESULTS AND REMARKS.
44.	M.	40.	Frost-bite of foot.	Chopart's amputation.	Died. Septic infection.
45.	M.	43.	Co. fracture arm and fore-arm. Fell thirty feet in shaft of mine.	Upper one-third of arm. Circular flap.	Primary union.
46.	M.	25.	Co. fracture tibia, followed by extensive necrosis.	Upper one-third of leg. Sédillot's method.	Primary union.
47.	F.	13.	Tuberculosis, knee joint.	Upper one-third thigh. Circular integumentary flap.	No primary union. Wound healed by granulation.
48.	F.	18.	Tuberculosis, knee joint.	Upper one-third of thigh. Circular integumentary flap.	Primary union. Excision of the joint had been performed.
49.	M.	25.	Com. gunshot fracture, tibia.	Knee joint. Lateral flap method. (Stephen Smith.)	Primary union.
50.	M.	30.	Hand blown from fore-arm in explosion.	Lower one-third fore-arm. Circular amputation.	Primary union.
51.	M.	45.	Co. fracture elbow joint. Railroad accident.	Lower one-third arm. Circular flap.	Primary union.

NO.	SEX.	AGE.	CAUSE.	PART AMPUTATED.	ULTIMATE RESULTS AND REMARKS.
52.	M.	50.	Crush of right leg by falling between the cars.	Lower one-third thigh. Circular integumentary flap.	Died eight hours after operation from shock.
53.	M.	10.	Tuberculosis of hip.	Hip joint. Dieffenbach's circular method.	Healed by granulation.
54.	M.	48.	Gangrene, fore-arm and hand.	Upper one-third fore-arm. Circular method.	Healed by granulation.
55.	M.	10.	Necrosis of humerus. Tubercular.	Shoulder joint. Amputation by circular incision.	Healed by granulation.
56.	M.	20.	Com gunshot fracture elbow joint.	Upper one-third arm. Unequal double-flap method.	Primary union.
57.	M.	43.	Extensive necrosis femur. Spontaneous fracture.	Hip joint. Wyeth's bloodless method.	Died ten hours after operation from shock.
58.	M.	21.	Gangrene of leg.	Middle of thigh. Circular integumentary flap.	Primary union.
59.	M.	19.	Co. com. fracture leg and thigh. Railroad accident.	Middle of thigh. Circular flap.	Died twenty hours after operation from shock.

NO.	SEX.	AGE.	CAUSE.	PART AMPUTATED.	ULTIMATE RESULTS AND REMARKS.
60.	M.	17.	Co fracture foot. Crushed in mine.	Lower one-third leg. Circular method with periosteal reflection. (Bryant, J. D.)	Primary union.
61.	M.	30.	Co. com. fracture tibia et fibula. Run over by wagon.	Middle of leg. Scéillot's method.	Primary union.
62.	M.	43.	Necrosis of stump. Re-ampputation.	Lower one third of leg. Circular method.	Primary union.
63.	M.	24.	Comp. com. fracture of humerus, and comp. com. fracture tibia et fibula. Fell between the cars.	Upper one-third of arm, circular method. Knee joint, lateral flaps, (Stephen Smith).	Died three hours after operation. Shock
64.	M.	25.	Co. com. fracture leg. Leg crushed in stone quarry.	Lower one-third thigh. Antero-posterior musculo-integumentary flaps.	Primary union.
65.	M.	32.	Extensive necrosis of tibia et fibula.	Lower one-third of thigh. (irregular integumentary flaps.	Primary union.
66.	M.	22.	Gangrene of foot. Frost-bite.	Lower one-third of leg. Circular method. (Bryant, J. D.)	Primary union.

NO.	SEX.	AGE.	CAUSE.	PART AMPUTATED.	ULTIMATE RESULTS AND REMARKS.
67.	M.	28.	Re- amputation. Railroad injury.	Lower one-third of thigh. (Circular integumentary flaps.	Primary union.
68.	M.	22.	Gangrene of leg.	Knee joint. Lateral flaps, (Stephen Smith.)	Primary union.
69.	M.	25.	Co. com. fracture of foot. Crushed in a mine.	Lower one-third of leg. Cir- cular method. (Bryant, J.D.)	Primary union.
70.	M.	42.	Co. com. fracture of foot. Caught between drawheads of cars.	Lower one-third of leg. Cir- cular method.	Primary union.
71.	M.	19.	Co. com. fracture of toes. Crushed by heavy steel rail.	Lisfranc's.	Primary union.
72.	M.	32.	Com. gunshot fracture of leg.	Middle one-third of leg, Circular method.	Primary union.
73.	M.	45.	Tuberculosis of shoulder.	Shoulder joint. Amputation by circular incision.	Healed by granulation.
74.	F.	20.	Tuberculosis of ankle joint.	Lower one-third of leg. Cir- cular method. (Bryant, J.D.)	Primary union.

NO.	SEX.	AGE.	CAUSE.	PART AMPUTATED.	ULTIMATE RESULTS AND REMARKS.
75.	M.	38.	Necrosis of shoulder, following injury and suppuration.	Shoulder joint. Amputation by circular incision.	Recovered from the operation but died three weeks later from prolonged suppuration.
76.	M.	38.	Co. com. fracture of tibia, involving knee joint. Gun-shot wound.	Lower one-third of thigh. Circular integumentary flaps.	Died 17 hours later from shock.
77.	M.	29.	Gangrene of the leg. Endarteritis.	Middle of thigh. Antero-posterior musculo-cutaneous flaps.	Healed by granulation.
78.	M.	38.	Co. com. fracture of elbow. Fell 90 feet down a shoot.	Lower one-third of arm. Circular method.	Greatly mangled and contused. Hemorrhage had been excessive. Died six hours after operation.
79.	M.	42.	Frost-bite of foot.	Chopart's amputation.	Primary union.
80.	M.	40.	Extensive necrosis of femur.	Upper one-third of thigh. Circular method.	Healed by granulation.
81.	M.	17.	Co. com. fracture of femur.	Upper one-third of thigh. Circular method.	The thigh had been supporting for two or three weeks prior to amputation. Healed by granulation.

NO.	SEX.	AGE.	CAUSE.	PART AMPUTATED.	ULTIMATE RESULTS AND REMARKS.
82.	M.	50.	Both hands blown off in explosion, and both eyes blown out.	Hands, lower part of fore-arms; enucleation of both eyes.	Recovered from operation, wounds healing by granulation. Died three months after leaving hospital.
83.	F.	13.	Extensive necrosis of tibia.	Lower one-third of thigh. Circular integumentary flaps.	Primary union.
84.	M.	20.	Gunshot wound of leg. Gangrene.	Lower one-third of thigh. Circular integumentary flaps.	Died from tetanus on tenth day.
85.	M.	28.	Painful stump. Adherent cicatrix. Neuromata.	Upper one-third of leg. Scédlitot's method.	Primary union.
86.	M.	13.	Gunshot wound of knee.	Lower one-third of thigh. Antero-posterior musculo-integumentary flaps.	Died two days later from shock.
87.	M.	52.	Both hands blown off, and both eyes blown out. Premature explosion.	Lower one-third of fore-arms, (1) circular method. (2) Antero-posterior musculo-cutaneous flaps. Enucleation of both eyes.	Recovered. Healing by granulation.
88.	F.	18.	Tuberculosis of ankle joint.	Lower one-third of leg. Circular method. (Bryant, J.D.)	Primary union.

NO.	SEX.	AGE.	CAUSE.	PART AMPUTATED.	ULTIMATE RESULTS AND REMARKS.
89.	M.	24.	Anchylolysis of knee joint at right angle. Result of injury.	Lower one-third of thigh. Circular integumentary flap.	Primary union. Artificial appliance.
90.	M.	17.	Re-amputation for painful stump.	Lower one-third of leg. Circular method. (Bryant, J.D.)	Primary union.
91.	M.	16.	Com. gunshot fracture of femur.	Upper one-third of thigh. Antero-posterior musculo-integumentary flaps.	Died nine hours later from shock.
92.	M.	42.	Extensive necrosis of femur.	Hip joint. Wyeth's bloodless method.	Healed by granulation.
93.	M.	39.	Sarcoma of fibula.	Knee joint. Lateral flap method. (Stephen Smith.)	Primary union.
94.	M.	20.	Co. com. fracture of ankle. Run over by cars in mine.	Lower one-third of leg. Circular method. (Bryant, J.D.)	Primary union.
95.	M.	69.	Co. com. fracture of tibia et fibula. Kicked by a horse.	Middle of leg. Circular method. (Bryant, J. D)	Healed by granulation. Subsequent re-amputation, primary union.
96.	M.	22.	Co. com. fracture of tibia et fibula. Fell under electric car.	Lower one-third of leg. Circular method. (Bryant, J.D.)	Primary union.

NO.	SEX.	AGE.	CAUSE.	PART AMPUTATED.	ULTIMATE RESULTS AND REMARKS.
97.	M.	21.	Tuberculosis, knee joint.	Middle of thigh. Circular integumentary flap method.	Healed by granulation. Subsequent removal of wedge-shaped piece from cicatrix.
98.	M.	23.	Co. com. fracture of humerus. Railroad accident.	Shoulder joint. Circular incision.	Healed by granulation.
99.	M.	21.	Gunshot fracture of elbow joint.	Lower one-third of arm. Circular method.	Primary union.
100.	M.	30.	Frost-bite of foot.	Lisfranc's operation.	Primary union.
101.	F.	26.	Co. com. fracture fore-arm. Thrown from runaway team.	Upper one-third of arm. Circular method.	Healed by granulation. Subsequent re-amputation, primary union.
102.	M.	25.	Tuberculosis of ankle.	Lower one-third of leg. Circular method. (Bryant, J.D.)	Primary union.
103.	M.	31.	Frost-bite of foot.	Chopart's amputation.	Primary union.
104.	M.	9.	Tuberculosis, knee joint.	Middle of thigh. Circular integumentary flap.	Primary union.

The 104 amputations performed were distributed as follows:

Fore-Arm, 7.—Three for explosion, in two both hands were blown off, making two double operations, two for tubercular caries of carpus, one crushed by machinery, and one for gangrene following frost-bite.

Arm, 10.—Four for railroad injuries, two for gunshot wounds, one for tubercular arthritis, three for accidents.

Elbow, 1.—Accident.

Shoulder Joint, 6.—Two for accident, two for tubercular arthritis, two for extensive necrosis of humerus.

Hip, 6.—Two for tubercular arthritis, three for extensive necrosis of femur, one for gunshot wound.

Thigh, 26.—Two for sarcoma, five for tubercular arthritis, six for gunshot wound, two for gangrene, five for extensive necrosis, and six for accident.

Knee, 6.—Two for epithelioma of foot, one for sarcoma of fibula, one for accident, and two for gangrene, one of which was a double operation.

Leg, 35.—Four for necrosis, one for gunshot wound, one for frost-bite, two for painful stump, five for tubercular arthritis and twenty-two for accident.

Lisfranc's, 3.—For frost-bite.

Chopart's, 3.—Two for frost-bite and one for crush.

Syme's, 1.—For crush.

There were ten deaths, or a mortality of 9.6 per cent. One died from septic infection following gangrene of feet as the result of frost-bite; two died from shock after amputation at hip joint, one was a boy six years old, result of a gunshot wound of femur,

and the other for extensive necrosis of the femur, in which symptoms of septic infection were very pronounced, and the patient *in extremis*. Five following amputation of the thigh, four of which were from shock following severe injuries, and one died from tetanus on the tenth day.

One from shock following a severe crush between the cars, in which a double amputation was performed at the knee, and upper one-third of the arm.

One died from exhaustion following amputation at left knee and right leg for gangrene resulting from frost-bite. Left hemiplegia.

A SYNOPSIS

OF



CLINICAL SURGERY

DURING THE SERVICE OF

SAMUEL H. PINKERTON, M. D.,

SURGEON TO THE HOLY CROSS HOSPITAL,

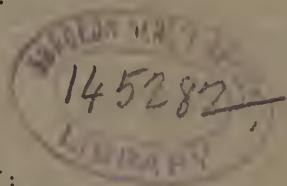
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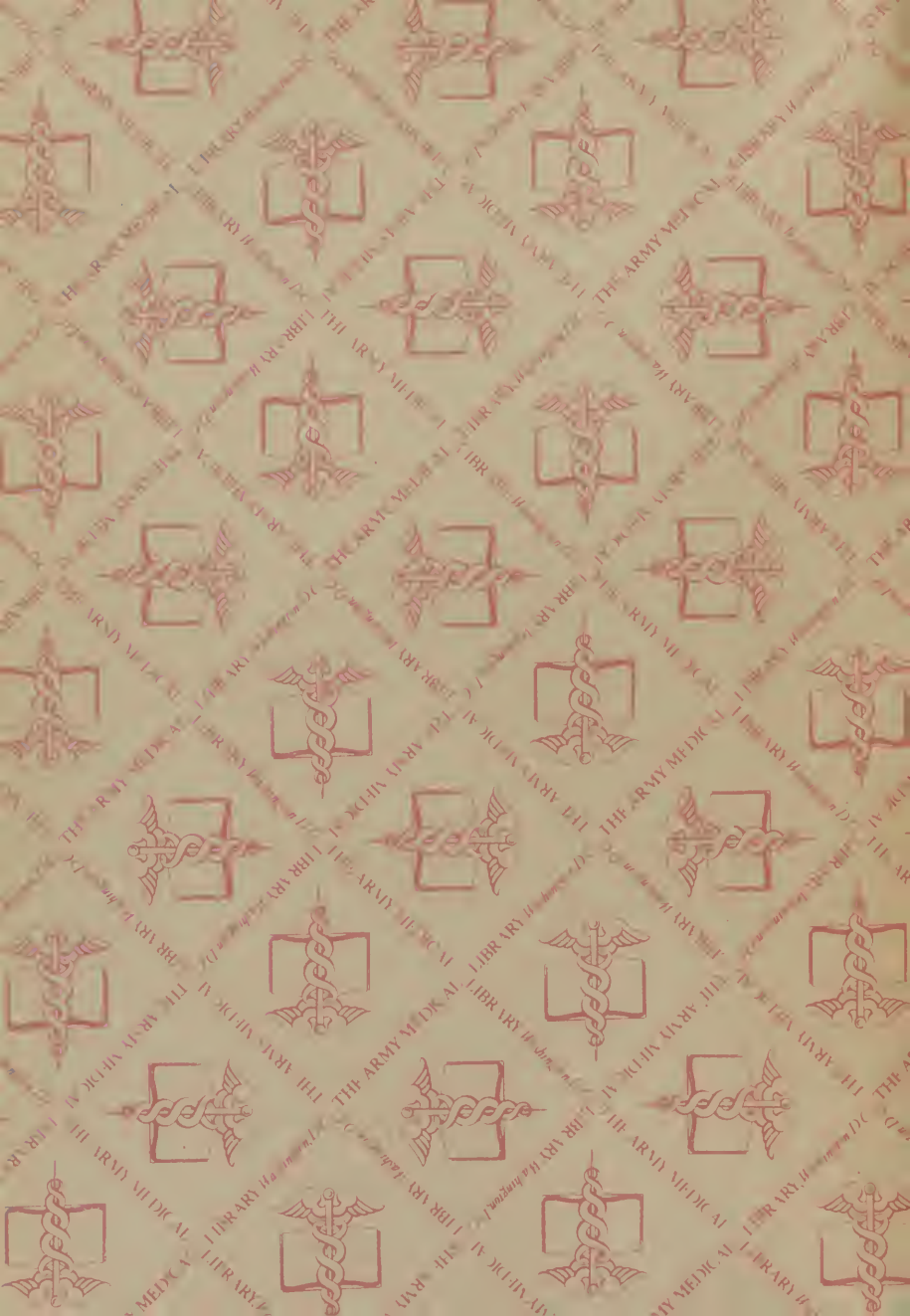
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